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THE SPONTANEOUS FLORA OF THE ARNOLD ARBORETUM

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Plate 21

WE read in one of the earliest records that has come down to us that the Lord God planted a garden eastward in Eden, and that he gave to the first man, who was obviously the first applicant, the position of gardener; also that the Lord walked in the garden in the cool of the day. All of which furnishes a sufficiently impressive tradition and warrant for the ancient and honorable craft of gardening, as well as for the founders, designers and planters of gardens, and for all such as take pleasure therein.

Groping back along the dim trails of Science, we glimpse man first as a forest dweller, dependent upon the trees for food, protection and shelter. Very early he must have learned to distinguish and esteem some of them above the others for the value of their products as well as for their stateliness and strength, and to have endowed them in his imagination with certain beneficent powers and virtues. Later when he ventured beyond the woodlands and became a hunter of game in the open meadows, the tradition of the forest was not wholly lost to him, and as soon as he attained sufficient culture to have fixed abodes and to build villages and towns he began not only to sow fields of grain for his sustenance but also to plant gardens and groves for the fruit that they yielded, for the comfort and pleasure they afforded, and above all as fitting places for the worship of his gods. Indeed, the worship of trees themselves appears to have been one of the earliest forms of religion amongst many races; and vestiges of these sylvan rites persisted long and are thickly woven into the warp and woof of later cultures, appearing again and again in their traditions, superstitions, folk-lore and forms of artistic expression, some of them having come down to our own times.

As the first crude beginnings of civilization centered about the field and the grove, so through all its later stages there was a steadily increasing development of agriculture and horticulture, which became the foundation for other arts. It would seem that one of the surest gauges of the stage of culture arrived at by the people of any age or land is to be found in a survey of the progress they have made in these arts and in their aesthetic appreciation of nature and of the ornamental garden. This is obviously true of our own times, as we witness with the increase of wealth

and culture the constantly growing interest that is being taken and the rapidly increasing effort that is being put into the planning and beautifying of private grounds and public gardens and parks, in the preservation of forest and national monuments, and in the developments of botanical gardens and arboretums for the study as well as for the development of plant life.

The botanical garden is one of the most specialized forms of planting, and naturally it appeared rather late in the history of gardening. The earliest examples were developed about the monasteries of the Old World, and later were attached to the universities that grew out of those religious communities. Like the science of botany itself, the botanical garden owes its origin to the real or supposed virtues of various plants used as simples in the healing art. In later times this interest became subordinated and the scope of the gardens was broadened to include the general scientific study of plants, the testing of newly discovered or recently introduced forms, with a view to determining their adaptability to ornamental use or their economic value in various ways. But the development did not stop here: In the modern botanical garden there is to be noted an ever increasing effort to combine the beautiful with the useful and to furnish demonstrations of what can be done in the harmonious grouping and arrangement of living plants.

The arboretum is a specialized form of the botanical garden, devoted exclusively or mainly to the growth and study of trees and shrubs. In the earlier botanical gardens and arboretums utility was the first consideration, and since the space devoted to them was generally quite limited, the formal arrangement of the plants in beds and rows according to some scheme of classification was usually adopted. This arrangement, while convenient for the study and for the harvesting of the plants, had little to recommend it from the aesthetic standpoint. And as the scheme broadened and better taste prevailed, it gradually gave place to the natural arrangement, in which the trees and other plants are brought together in groups, usually arranged with some regard to taxonomic relationships, but in which a certain semblance to nature is also sought, and consideration is given to the harmony of the various parts with each other and with the surroundings as well as with the contour of the land occupied.

In the most carefully planned artificial parks and gardens something more, as well as something less, than an imitation of nature is attempted: It is an idealization of nature, made up of material drawn from many sources and brought together in an ensemble such as could never be found in a chance growth. In proportion as more or less emphasis is placed upon scientific classification or artistic effect the plan is modified, and it would seem that the ideally developed botanical garden or arboretum is one in which a happy balance has been worked out between convenience of grouping to facilitate scientific study of the plant collections and the pleasing effect of a natural and harmonious arrangement.

To the true lover of trees and flowers and of all nature, who combines an intelligent interest in their scientific study with an artistic appreciation of their beauty, singly or in the broader vistas of group and landscape, the poetry of form and color so differently expressed in the carefully modulated shades and lines of the well-planned garden and in the greater freedom and bolder strokes of untamed nature, each has a strong appeal. But the line between Nature's great wild gardens and those planted and tended by man is not a hard and fast one. The latter are built up of material culled from the former, and Nature herself is the builder if not the designer, guided only by man's selection and aid in planting, pruning and cultivating the things he deems most desirable. There is also a constant effort of Nature to reassert her sway and reclaim for herself the areas that men have planted. Even in the best kept gardens this jealous resistance of Nature is not entirely overcome, if it be expressed only in a few weeds and wild flowers that spring up in beds and borders or in little tracts that are temporarily free from the gardener's attention. If bits of meadow or rugged banks or the borders of brooks and ponds are left at suitable places to the native plants it seldom fails to add to the charm and interest of the garden.

In the Arnold Arboretum this blending of the natural and the artificial has been part of the plan from the beginning, and while the principal object has been the bringing together of a collection of such trees and shrubs, from all parts of the world, as can be grown in the open in the climate of New England, the most careful consideration has also been given to landscape effect. Remnants of the native woods and open spaces of meadow and grassy slopes have been left at intervals as examples of the wild flora, and these bits of the primitive have been so happily blended with the planted groups as to add greatly to the general result. It is thus possible here within the boundaries of a great city not only to enjoy the extensive collections of exotic trees and shrubs, but also for those who are interested in the native trees and wild flowers, either from the standpoint of the scientific student or merely as lovers of them for their beauty and charm, to see a considerable representation of the spontaneous flora.

Here one may wander along cool shaded paths through the Oak and deciduous woods or in the deeper shadows of the stately Hemlocks, where but for the distant hum of the busy city streets the impression of complete seclusion in the primeval forest may be found. Or in the open spaces he may stroll along paths bordered with Violets or Buttercups or with Golden-rods and Asters, according to the season; or pass by banks of ferns or along the margins of ponds and brooks, where Loosestrife and Mallow and Iris bloom, or where rushes and Joe-Pye and Elder toss their heads above the modest Crowfoot and Forget-me-not that cling to the edge of the water. And if his interest and enterprise lead him further he may be rewarded by the discovery of many rarer plants, which should be observed and spared so that they may persist to delight the long line of kindred spirits and

nature lovers who will follow in his footsteps as the years and centuries pass.

So while the scientific activities of the Arboretum are devoted to the propagation, display, and study of woody plants, it is recognized that the bits of native woodland and meadow with the wild flowers, ferns, grasses and other spontaneous plants scattered through them add much to its interest and play no small part in the attractiveness of the place.

It is the intention of this paper to briefly describe the spontaneous flora of the Arboretum as it exists today, mentioning also a few of the more conspicuous species that have disappeared in recent years, so far as the meager data now available make it possible. The purpose is two-fold: to serve as a guide to those visitors who are interested in the wild flowers and other spontaneous plants, and also as a record for future reference, since doubtless many of the native plants now growing here are doomed to a more or less speedy extermination, while the element composed of foreign and introduced species will be gradually changed and probably will come to constitute an increasingly large proportion of the flora as the years go by.

Introduced plants seem at present to constitute about thirty per cent of the spontaneous flora. A few of these, such as some of the ferns and more conspicuous wild flowers, were introduced by design through the efforts of the late Director, Professor Charles S. Sargent, of the former Assistant Director, Charles E. Faxon, of Jackson Dawson, the late superintendent, and others. Most of them, however, especially the less conspicuous species, such as would be popularly classed as weeds and grasses, have been accidentally introduced in various ways and from a variety of sources. Most of them are common in the Boston area, but a few unusual things have turned up, which will be mentioned later.

Since it is impossible in many cases to distinguish certainly between those species which were originally planted and the others which have been introduced through natural agencies, all of the herbaceous plants now growing spontaneously in the Arboretum have been included in the list. And although a similar uncertainty also exists in regard to some ligneous species that have run wild or have spread more or less extensively from the planted groups, it seems desirable for obvious reasons to follow a more conservative course in regard to them, and only such species are included as have become so well established that they apparently might be able to maintain themselves indefinitely if left undisturbed.

The Arnold Arboretum contains within its present limits an area of about 260 acres. This tract is roughly oblong in outline with its major axis, which is nearly a mile in length, extending from northeast to southwest. The width varies from less than an eighth to slightly more than a quarter of a mile. The direct distance from the Jamaica Plain gate near the Administration Building to the Roslindale gate is about 4800 feet, or nearly nine tenths of a mile, but in following the roads and paths this is lengthened to more than a mile. The wildest part of the grounds

lies a little beyond the center of the Arboretum, as one goes from the Administration Building, and extends from a point about half way between the Center Street and Walter Street gates to the southeast side of Hemlock Hill on South Street.

The surface of the Arboretum is quite varied, ranging from low flat areas, some of which were originally ponds and bogs, through gentle slopes and knolls to rocky outcrops and ridges, culminating in several distinct hills of considerable elevation. The altitude varies from a minimum of about 50 feet above mean tide level in the low ground near the Administration Building and at a few other points, to 150 feet along the rocky crest of Hemlock Hill, 180 feet on Bussey Hill, and 237 feet at the summit of Peters Hill.

Two brooks enter the Arboretum area. The first and smaller of these flows for a short distance just inside the wall near the Jamaica Plain entrance, passing under the road near the Administration Building. Bussey Brook, which is a perennial stream, flows through the central part of the Arboretum, from the Walter Street gate, through a bit of open meadow and along the base of Hemlock Hill, across South Street and through the lower part of the South Street tract, where through a diverted channel it has been led into the pond recently constructed there.

Several more or less permanent springs are found within the Arboretum. The most interesting of these issues from under a rocky ledge, near the Chestnuts. The small stream of pure cool water which flows through the tiny rocky gorge near the edge of the natural Oak woods at this point makes it an attractive spot much frequented by visitors on hot summer days. Along the course of Bussey Brook there are several other small springs, most of which become dry during parts of the year. Springs also issue along the base of Peters Hill, on the southeast side, forming small boggy areas, which will be described later.

There are four small ponds in the Arboretum at present, including the one recently constructed on the South Street tract, which is larger and deeper than any of the others. The other ponds are located near the Shrub Collection and the Forest Hills gate, one of them being on the left of the road, as one enters through that gate, and the other two on the right, amongst the Plums and Cherries planted between the roadway and the formal rows of shrubs.

The rocks and other superficial deposits of the Arboretum show evidence of two geological periods, previous to the recent, which were widely separated in time. All of the outcrops of solid rock are of the Roxbury conglomerate or "pudding stone," which has been referred doubtfully by geologists to the Permian period. Outcrops of this formation occur at several places in the central and southern parts of the Arboretum, and they occupy about three per cent of the surface area. Of much greater extent are the deposits of gravel, sand, clay and other unconsolidated material left by the glaciers of the Quaternary age. The soils and loose

gravel found on the surface or at a little depth beneath it, in the more level and lowest parts of the area represent the most recent effect of geologic action, and these have resulted from the working over of the older deposits or from the effects of erosion upon them.

The Roxbury conglomerate is a massive and partially stratified deposit consisting of worn or rounded pebbles and boulders of granite, diorite, quartzite and other rocks, mainly igneous and crystalline, cemented together into a hard and solid mass with a matrix of finer, slate-like material. The beds have been much disturbed since they were originally deposited, resulting in folding, tilting, and in the presence of many faulting planes that cut through the rock at all angles. The stress, which under heavy pressure, caused these movements and the resulting cleavage through the uneven texture of the stone has produced in many places a surface as smooth as if it had been cut with a great knife.

It has recently been suggested¹ that the peculiar shape and character of the pebbles and boulders in this formation, and certain faint striations found upon some of them, indicate that they were of glacial origin, the deposit representing terminal moraines of an ice age that occurred far back towards the close of Paleozoic time.

Ledges and detached masses of this formation come to the surface at several places in the Arboretum. The most extensive outcrops are found to the south of Bussey Brook, extending from the South side of Bussey Street, at the foot of Peters Hill, for about 1500 feet towards the east, terminating in the rugged and almost precipitous crest of Hemlock Hill, where a splendid bit of the primeval Hemlock forest has survived. An old quarry, which was opened up near the south side of this area, and which has been abandoned for some years, exposes perpendicular sections of the conglomerate several yards in thickness. Many weedy plants have appeared amongst the rubble and rubbish of this abandoned quarry, some of which have not been found elsewhere.

Beds and ledges of the conglomerate are also found on the north side of the brook and between the Hickories and the main group of Conifers. At the east end of this outcrop, amongst the Chestnuts and close by the Valley Road, a ledge of this rock is exposed which shows an excellent example of the action of the ice in the last Glacial period, the surface over which the moving ice with its freight of rocky debris passed being polished and striated and clearly showing the direction of the glacier down the valley and towards the bay.

It is on the hills and slopes occupied by the Roxbury conglomerate that most of the remnants of the primitive woods have been preserved, and in such places also many of the native herbaceous plants have persisted.

The unconsolidated deposits of silt, sand, and clay, and of the coarser rock material brought in by the ice in its seaward movement during the

¹Sayles in Bull. Mus. Comp. Zool., Harvard University, LVI. (Geol. Ser. x.). 141-170, and in Science, XXXII. 723 (1910).

Glacial period in the Quaternary era, and left as it melted and retreated, covers much of the surface of the Arboretum, including nearly all of the higher ground where the old conglomerate does not appear.

Manifest evidence of the action of the ice is also found in the smoothed and striated surfaces of some of the conglomerate ledges, like that mentioned above, near the Chestnut collection, as well as at higher levels near the same locality, on the slopes of Bussey and Hemlock hills, and elsewhere. Detached boulders of various sizes found at several places in the Arboretum were also transported by the ice and deposited in their present positions. Some of these were derived from the near-by conglomerate beds and others of granite or diorite were brought from greater distances. Good examples of these erratics may be seen along the west and south slopes of Bussey Hill, on the northwest side of Peters Hill, and close beside the path near the *Cercidiphyllums*, not far from the Administration Building.

The course of the glaciers as they followed the little valleys between the higher elevations, as the ice sheet that had at one time covered the entire area diminished, can be traced clearly in places by observing the present topography, as well as through the more direct evidence of the striations on the rocks.

Peters Hill and Bussey Hill owe their present form largely to the action of the glaciers, the heavy clay and gravel loads carried by the ice having been deposited over and about the rocky peaks or ridges of conglomerate, which were exposed here before they were worn down by the moving ice sheet. A lighter deposit of similar material probably at one time covered all or much of the surface of Hemlock Hill, but most of this was later removed by erosion, again exposing the ancient rocks, which still show evidence of the passage of the ice in their smoothed surfaces on the lower protected slopes, while in the more elevated parts the work of excavation and erosion has gone farther, and the fractured and upturned ledges have been broken down in places and reduced to their present rugged and picturesque form.

Farther down towards the low ground near the Administration Building a series of low hillocks and ridges with typical moraine topography marks the point where a branch of the glacier terminated and as the ice melted, deposited its burden of gravel and other material that now forms the kames and eskers on which a bit of the native deciduous forest has been preserved. The low ground extending unbrokenly from this point through the Fenway to the Back Bay, and on which a large part of Jamaica Plain and other parts of Boston have been built, evidently at the time of the glaciers formed part of the bay, most of it later being occupied by a series of fens and lakes, of which Jamaica Pond and other remnants still exist, although drainage and the other works of civilized man have greatly diminished them in recent historic times. Part of the shore line of the old embayment can be readily traced with the eye in the range of low

hills that bound the level plain as one comes down Center Street towards the Arborway and the Arboretum.

Another branch of the glacier within the present limits of the Arboretum passed to the south of Hemlock Hill, leaving its traces in the smooth beveled surface of the conglomerate to be seen just within the Arboretum wall along Bussey Street, and in the gravelly hillocks and ridges where it terminated in the low ground towards Forest Hills.

Looking at these obvious evidences of the former presence of the glacial ice we can trace in imagination something of the strange conditions that once prevailed where we now enjoy the varied beauties of the Arboretum.

Standing on some vantage point along the shore we watch the great slowly moving rivers of ice coming down from the highlands which are almost covered with the glistening mantle, with only a rocky point or the top of some hill showing bare and bleak against the sky-line. At the water front great masses of the ice cliff break off and float away as icebergs into the bay and out to sea, and the load of debris is deposited first in the bay, gradually filling it, and later as the summers begin to grow warmer and the ice to retreat, it is piled up in the kames and eskers of the terminal moraine that we now see along the old shore line. Time goes on and the ice gradually retreats, leaving a desolate scene of bare rocks, barren knolls, and muddy flats, interspersed with innumerable lakes, ponds and fjords. A tundra vegetation of lichens and mosses and an ever increasing number of the hardier herbs and shrubs soon comes to occupy the more favorable situations. A coniferous forest succeeds, with Alders, Willows, and a varied assemblage of other shrubs, ferns, and flowering herbaceous plants in the bogs and depressions. Then the Oaks, Beech, and Maples and their many associates that make up the deciduous woods begin to creep cautiously back from the southern coasts and mountains to which the ice had driven them, and the forest begins to assume the familiar aspect characteristic of our beautiful New England hills and lowlands.

The Indian glided silently through these deep forests, of which now only a few depleted fragments remain. Here he hunted the deer and other wild game and held councils about his camp fires amongst the stately Hemlocks, or from the shores he pushed his canoe across fjords and lakes in quest of seals and fish. Specimens of the stone arrow points that he used in the hunt or in war are still sometimes picked up in the Arboretum.

Then came the white settlers from across the seas, felling the forests and destroying with axe and fire, sometimes recklessly, and sometimes, let us hope, to build a better order and at last to plant a fairer garden.

By rare good fortune a bit of the primeval Hemlock forest was preserved on the rocky slopes and crest of the ridge to the south of Bussey Brook; and this is now one of the most beautiful and interesting features of the Arboretum, and it is also without doubt, taking into consideration the size and typical character of the trees and the romantic and congruous aspect of the surroundings, the finest example of a similar growth to be found in any park or garden near a great city.

The areas of deciduous woods that still remain on the rocky slopes and on the gravelly knolls of the terminal moraines also serve well to illustrate on a small scale this type of forest. And so it has been possible to conserve here without interfering with the wider and more special work of the Arboretum a considerable part of the wild life of New England, both of its native flora and through the protection and encouragement that it affords, a surprisingly large number of native and introduced birds and several mammals and reptiles, besides many of the lower forms of animal life. In the partially swampy meadow opposite the Administration Building and about the margins of the ponds the muskrat still finds a place for his home; the woodchuck has his burrow along the steep wooded slopes of Hemlock and Peters Hills; skunks and chipmunks also find safe retreats and an abundant supply of forage. The gray squirrel is so abundant as sometimes to become a nuisance through his destruction of nuts and seeds in spite of the interest he affords by his sprightly and cunning ways; also the red squirrel has been occasionally observed. Moles, rats and mice are additions, although undesirable ones, to the list of mammals. The gray fox is sometimes found in the Arboretum, and rabbits have been seen in recent years, although none are known at present.

Bird life is a most interesting feature of the Arboretum, and every effort is made to encourage and protect the more desirable species. In the summer and throughout most of the year the shrubs and trees furnish abundant food for them, and this is supplemented in winter by a supply of grain. Water and houses for nesting are also supplied for the birds in various parts of the Arboretum. Unfortunately, however, it is not possible to discriminate between the more timid and desirable of our feathered friends and the aggressive starlings, sparrows, and crows. The necessity for frequent spraying of trees and shrubs as a protection against destructive insects has proved detrimental to the birds, and some species that formerly nested in or visited the Arboretum are no longer found here.

Mr. Charles E. Faxon, who was a careful student of bird life and who had an opportunity to study the birds of the Arboretum from the beginning, has fortunately left a record of the species known to visit or nest here, and as some of these have since disappeared it is of considerable interest now.¹ A brief account of the bird life, by the same author, may also be found in the Guide to the Arnold Arboretum.

Before being taken over for its present use, most of the Arboretum area was included in the Bussey Farm, and the flora in some parts had doubtless been considerably changed from its primitive condition. But in spite of over two centuries of occupation by civilized man, several tracts of woodland remained, and much of the flora of bog and meadow was little disturbed. In the process of being adapted to its present use further inroads into the previously undisturbed habitats of the native plants have necessarily been made; but on the other hand, with the cessation of

¹ *Garden and Forest*, viii. 292-93 (1895).

grazing and with the attention that has been given to those parts of the woodland and other open spots, better protection has been afforded and there has been an actual recovery and return towards a natural development, so that it is even now possible to recognize in such places certain plant associations and to see their relation to habitat and to ecological conditions.

Opposite and to the south of the Administration Building lies an area of several acres that was occupied by a bog until artificially drained only a few years ago. This is now overgrown with a dense cover of native and introduced plants, many of which are of a weedy character. In seasons of abundant rainfall water stands for some time on the lower parts, giving it still a somewhat marshy aspect. Along the southeast side, where many of the Willows are planted and where some young specimens of the Bald Cypress have recently been set out, water seeping from the bank just inside the Arboretum wall keeps a strip along the margin of the meadow moist for a considerable part of the year. And since the ranker vegetation is kept down here by frequent mowing, a number of small hydrophytic plants are to be found throughout the season. Amongst these are beds of the tall moss, *Polytrichum commune* var. *paragonianum*, the Sensitive Fern (*Onoclea sensibilis*), the Swamp Shield Fern (*Thelypteris palustris*), *Cyperus strigosus*, and several other sedges, besides numerous grasses and species of *Juncus*, *Sagittaria latifolia*, *Viola lanceolata*, *V. papilionacea*, *Hypericum canadense*, *H. mutilum*, *Agalinis tenuis* and *Prunella vulgaris*. Most of the tract is left unmowed during the summer, and the ground is occupied by tall weeds and grass, amongst which a few shrubs, such as the Staghorn Sumach, Elderberry, Meadowsweet and brambles have gained a foothold.

Amongst the more interesting and conspicuous plants found here are the Turk's-cap Lily (*Lilium superbum*), *Iris versicolor*, *I. pseudacorus*, the Great St. John's Wort (*Hypericum Ascyron*), Purple Loosestrife (*Lythrum salicaria*), Skunk Cabbage (*Symplocarpus foetidus*), Spotted Cowbane (*Cicuta maculata*), Tall Meadow Rue (*Thalictrum polygamum*), Water Hoarhound (*Lycopus americanus*), Hemp Nettle (*Galeopsis Tetrahit*), Tall Evening Primrose (*Oenothera biennis*), Mint (*Mentha arvensis*), Verbain (*Verbena hastata*), Tansy (*Tanacetum vulgare*), the tall Wild Lettuce (*Lactuca canadensis*), Cup-plant (*Silphium perfoliatum*), and several species of *Solidago* and *Aster*. Rushes, sedges and grasses are also abundant, such species as *Scirpus cyperinus*, *Carex stipita*, *C. pennsylvanica*, *Glyceria nervata*, and *Calamagrostis canadensis* often being conspicuous. Many other plants besides those enumerated above are to be found in this bit of swampy meadow at different seasons, but the spot is particularly conspicuous in autumn when the New England Aster, the White Panicked Aster, the New York Aster, and the Tall and Rough-leaved Goldenrods, besides other late blooming plants, deck it with a gorgeous variety of color. Tansy and other aggressive weeds are at present gradually crowding

out many of the more attractive plants, and it is probable that some of the latter would soon disappear even if the tract were left in its present wild state, which, however, is not likely to continue for many years more. The Fringed Gentian is reported to have grown here before the drainage of the tract and up to a few years ago, and doubtless many other plants might have been found at that time which are now gone forever from the Arboretum.

There are several other bits of low and boggy ground in various parts of the Arboretum where marsh-loving and hydrophytic plants find a habitat. These are generally very local and are mostly confined to the borders of the brooks and margins of ponds and to a few places where springs or seepage water issues from banks or hillsides. There is also another rather more extensive area of low ground, at present in an undeveloped state and much of it overgrown with weeds, on the South Street tract, where a pond was constructed about three years ago. Many plants, of which a large proportion are immigrants, have been found here. During the construction of the pond and in the following season a rank growth sprang up on the mud and peat banks resulting from the excavation. A considerable collection was made at this place during two seasons and the plants are included in the list given at the end of this paper, although some of them were perhaps only waifs that cannot be expected to persist or be found again in the Arboretum. Some of the species found here were *Eragrostis caroliniana*, *Leersia virginica*, *Setaria verticillata*, *Stenophyllus capillaris*, *Polygonum orientale*, and several native species of the same genus, *Polygonella articulata*, *Celosia argentea*, *Humulus japonicus*, *Stellaria graminea*, *Sisymbrium altissimum*, *Erysimum cheiranthoides*, *Penthorum sedoides*, *Potentilla monspeliensis*, *Melilotus officinalis*, *M. alba*, *Trifolium incarnatum*, *Dalea alopecuroides*, *Althea rosea*, *Epilobium angustifolium*, *E. coloratum*, *Oenothera biennis*, *Scutellaria lateriflora*, *S. epilobifolia*, *Galeopsis Tetrahit*, *Lycopus americanus*, *Mentha arvensis*, *Petunia violacea*, *Bidens cernua*, *B. vulgata*, *Arctium minus*, *Helianthus annuus*, *Centaurea Cyanus* and *Sonchus oleraceus*. Considerably more than one hundred species of plants were collected at this locality, but the few mentioned here will serve to give an idea of the cosmopolitan character of the flora.

In the bits of boggy meadow along Bussey Brook and elsewhere a considerable number of interesting plants are found, and in these places the flora has been preserved more nearly in its original state than anywhere else in the Arboretum except in the native woods. Here the grass and other forms of rank vegetation are kept down by periodic mowing except along the immediate margins of the brook, and so the smaller plants have had a chance to survive as in the border along the Willow collection mentioned above. On the upper part of the slope between the Conifers and the brook a few, mostly introduced, perennials are conspicuous. Black-eyed Susan (*Rudbeckia hirta*) grows here and is quite showy in the late summer when it gets an opportunity to bloom between mowings of the

meadow. The Fall Dandelion (*Leontodon autumnalis*) is also abundant here, as it is in all the open grassland, and Queen Anne's Lace, which is a pretty and not undeserved name for the delicate white unbellate flowers of the humble garden Carrot (*Daucus Carota*), decorates the meadow from mid-summer until the coming of the late autumn frosts. Two species of the curious and dainty little Lady's Tresses (*Spiranthes cernua* and *S. Beckii*), as well as the Ragged Fringed Orchis (*Habenaria lacera*) and the delicate pink-flowered *Gerardia tenuifolia*, spring up amongst the grass. In wetter ground a little lower down are found the Ground Pine (*Lycopodium complanatum* var. *flabelliforme*), the Scouring Rush (*Equisetum arvense*), the Sensitive Fern (*Onoclea sensibilis*), Sweet Vernal Grass (*Anthoxanthum odoratum*), *Carex lurida*, *Juncus effusus*, and several other sedges and rushes, also the Blue-eyed Grass (*Sisyrinchium atlanticum*) and the two Violets *Viola cucullata* and *V. lanceolata*.

A growth of tall herbs and shrubs borders the brook, in which the Elderberry (*Sambucus canadensis*), Joe Pye Weed (*Eupatorium verticillatum*), Thoroughwort (*Eupatorium perfoliatum*), Poison Hemlock, Tall Meadow Rue, the Tickseed (*Bidens frondosa*), *Solidago altissima*, *Aster paniculatus*, *Aster novae-angliae*, and *A. novi-belgii* are most conspicuous. There are also a number of robust grasses and sedges, such as *Phalaris arundinacea*, *Poa palustris*, *Calamagrostis canadensis*, *Scirpus cyperinus*, *Carex crinita* and *C. debilis* var. *Rudgei*. Plants of lower growth along the open margins of the brook, or partially concealed amongst the grasses and taller herbs, are the Hairy Milkweed (*Asclepias incarnata* var. *pulchra*), the Turtlehead (*Chelone glabra*), Mint, Water Hoarhound, *Bidens connata* and many others. The curious little parasitic Love-vine or Dodder (*Cuscuta Gronovii*) twines its amber evanescent stems about some of the upright herbs, and *Polygonum sagittatum* and *P. scandens* climb amongst them in places, forming a tangled mass. Near the rustic bridge across the lower part of the brook another interesting vine, the Climbing Hempweed (*Mikania scandens*) is growing in the protection of a rocky bank. On the immediate margins of the stream the Jewel-weed (*Impatiens biflora*), the Creeping Buttercup (*Ranunculus repens*) and the Forget-me-not (*Myosotis scorpioides*) blossom in modest retirement along the moist shaded banks, and on muddy margins or in the shallow flowing water the Marsh Purselane (*Ludvigia palustris*), and the Water Starwort (*Callitriche heterophylla*) trail or float with their slender prostrate branches.

Near the base of Peters Hill, on the southeast side, a seepage spring issues in a swale or depression which the water follows down the slope to the boundary of the Arboretum near the railway embankment. At the highest point where the water seeps from the bank and again lower down and across Peters Hill Road the ground is kept moist and is quite boggy over small areas. Many of the plants are identical with those mentioned from the other localities, but in addition *Equisetum sylvaticum*, *Carex hirta*, *C. lanuginosa*, *Saxifraga pennsylvanica* and *Hydrocotyle americana*

occur. On the nearby grassy slopes but beyond the boggy area Yellow-eyed Grass (*Hypoxis hirsuta*), the Ground Nut (*Amphicarpa monoica*) and the Shin Leaf (*Pyrola elliptica*) are found.

The ponds near the Shrub Collection furnish a habitat for a number of aquatic and hydrophytic plants. The Water Lily (*Nymphaea odorata*) and the Pickerel-weed (*Pontederia cordata*) grow well out in the shallow water and are very attractive when in bloom; the Water Chestnut (*Trapa natans*), the Slender Pond-weed (*Potamogeton filiformis*) and the Feather-foil (*Hottonia inflata*) with its curious inflated stems half floating in the water, are also sometimes found.

The circumstances under which the last named plant appeared here are rather curious. During the season of 1924 a pair of wild ducks nested on the margin of one of the ponds, and in the same summer specimens of the *Hottonia* were observed growing in the pond. The following year the plants persisted and bloomed, but after this they disappeared and have not been found since.

All along the margins of the ponds, from the mud flats submerged during part of the year, but which gradually increase in area as the water becomes low in summer, to the higher banks, there is an abundant and varied growth of herbaceous plants, some of which have doubtless been planted for their natural attractiveness, while others belong to the native flora or have come in as weed immigrants and have established themselves here. Amongst the more conspicuous and interesting species are *Onoclea sensibilis*, *Marsilea quadrifolia*, *Equisetum arvense*, *E. limosum*, *Sparganium eurycarpum*, *Sagittaria latifolia*, *Alisma Plantago-aquatica*, *Iris versicolor*, *I. pseudacorus*, *Acorus Calamus*, *Cinna arundinacea*, *Glyceria canadensis*, *G. acutiflora*, *G. grandis*, *G. nervata*, *Polygonum Muhlenbergii*, *P. arifolium*, *P. amphibium*, *Filipendula ulmaria*, *Hibiscus Moscheutos*, *Lythrum Salicaria*, *Cicuta bulbifera*, *Sium suave*, *Decadon verticillatus*, *Eupatorium verticillatum*, *Solidago canadensis* and *Bidens cernua*. The slender little Marsh Speedwell (*Veronica scutellata*), the Mad-dog Skullcap (*Scutellaria lateriflora*) and the Jewel-weed grow in places along the wet shaded banks, and as the water recedes from the mud flats many small grasses, sedges, and other weedy plants spring up; amongst these are *Poa annua*, *Eleocharis obtusa*, *E. acicularis*, *E. tenuis*, *Stenophyllus capillaris* and depauperate specimens of *Bidens cernua*.

The first bit of native deciduous woods found in passing through the Arboretum from the Administration Building occupies the low glacial knolls and ridges just beyond the Aesculus group to the right of the Meadow Road and between the Maples and the Shrub Collection on the left. This may be called the North Woods, and it is so referred to in the list of species at the end of this paper. Oak, Ash and Maple are the commonest trees here, some of the Red Oaks (*Quercus borealis* var. *maxima*) and White Oaks attaining a large size. White Ash is also abundant with some large specimens. Other forest species are the Sugar Maple (*Acer sac-*

charum), Sweet Birch (*Betula lenta*), Hop Hornbeam (*Ostrya virginiana*), Beech (*Fagus grandifolia*) and Black Oak (*Quercus velutina*). The woods are of an open character, having been much thinned, and there is little undergrowth. Single specimens or clumps of Black Haw (*Viburnum Lentago*) and Choke Cherry (*Prunus virginiana*) occur in some places and young growth of Birch, Beech and Maple are in evidence in the more open parts. Elsewhere, and especially along the edge of the woods, various introduced shrubs, such as *Lonicera*s, Barberry and Service Berry, have become established. In such an association it is not always possible to distinguish the spontaneous from the planted trees and shrubs. Occasional specimens of Linden (*Tilia glabra*) and *Amelanchier oblongifolia* probably belong to the native growth, and a large tree of *Ulmus americana* in a bit of low ground at the base of the hills appear to be spontaneous. On the knolls to the left of the road most of the woody growth has been cleared away, leaving only scattered specimens of Oaks and a few other sorts of trees.

The herbaceous flora here is not so varied as in some other sections of the deciduous woods. Typical plants are *Carex pennsylvanica*, *Luzula campestris* var. *multiflora*, *Thalictrum dioicum*, *Lysimachia quadrifolia*, *Desmodium canadense*, *Lobelia inflata*, *Prenanthes alba*, *Solidago caesia* and *Aster cordifolius*. *Apocynum androsaemifolium* and *Helianthus divaricatus* are found on the edge of the woods, and the curious and delicate Indian Pipe (*Monotropa uniflora*) sends up its waxy pink stems and flowers through the carpet of Oak leaves towards the end of the summer. *Houstonia longifolia* was also collected here on one of the gravelly ridges, but it appears to be quite rare. *Hepatica triloba* and *Silene pennsylvanica* are reported to have been growing here after the establishment of the Arboretum, but both have now disappeared.

Several species of ferns grow abundantly towards the bases of some of the knolls and along the paths bordering the lower ground, and they add much to the attractiveness of this part of the Arboretum. In places the banks are covered with a dense growth of the Hay-scented Fern (*Dennstaedtia punctilobula*), the New York Fern (*Thelypteris noveboracensis*), and the Lady Fern (*Athyrium angustum*), interspersed with clumps of *Osmunda Claytoni*, *O. regalis* and *Thelypteris Bootii*. Lower down in the moist swales the Ostrich Fern (*Pteritis nodulosa*) is growing, and in the boggy depression where the Cork-wood (*Leitneria floridana*) has been planted Jack-in-the-pulpit (*Arisaema triphyllum*), Skunk Cabbage and Clearweed (*Pilea pumila*) have persisted, while the Star of Bethlehem (*Ornithogalum umbellatum*) and a wild Garlic (*Allium carinatum*) have become established.

Other areas of deciduous woods through the central portion of the Arboretum are of similar type, but the list of trees and shrubs as well as of herbaceous plants in some of them is much more extensive. On the bank above the Lindens, the Shag-bark Hickory (*Carya ovata*) is growing

with the Red Oak and other native trees. Along a steep slope beyond the ponds and adjoining the Bussey grounds a narrow strip of woods has been left. Red and White Oak are abundant, and the American or White Elm and Butternut are also found, with *Prunus virginiana* as an undergrowth. On the dry slopes near this point the little Deptford Pink (*Dianthus Armeria*) and the Wild Garlic (*Allium carinatum*) are abundant, and in moister shaded situations near the base, Enchanter's Nightshade may be found. The Wood Arvens (*Geum canadense*) is also growing in partially shaded situations here.

On the conglomerate outcrops and the slopes to the north of Bussey Brook and between the Hickories and Chestnuts and the main Conifer collection many of the native trees and shrubs remain, and various characteristic herbaceous plants are found amongst them. This is referred to hereafter as the Central Woods. White, Red and Black Oak are all present and a few specimens of the Bear Oak (*Quercus ilicifolia*) remain. *Pinus rigida* and *Juniperus virginiana*, growing amongst the rocks both appear to be native here. Amongst the other spontaneous trees are the Pignut Hickory, Hornbeam and Beech. Poison Ivy and the Dewberry, (*Rubus recurvans*) climb or trail over the rocks, and in more open places the low Blueberries (*Vaccinium pennsylvanicum* and *V. vacillans*) are very abundant. The list of herbaceous plants that are commonly found includes the Bracken (*Pteridium aquilinum* var. *latiusculum*), *Maianthemum canadense*, *Baptisia tinctoria*, *Melampyrum lineare*, *Solidago puberula*, *Aster patens*, *A. undulatus*, *A. divaricatus* and *Antennaria fallax*. Similar conditions prevail and the same type of flora is found in several other small rocky and wooded areas throughout the Arboretum, but in some of them many of the native plants have disappeared as a result of thinning of the woods or other changes from the former natural state. The largest wooded area remaining in the Arboretum lies to the south of Bussey Brook and between the valley of that little stream and the foot of Peters Hill. The Roxbury conglomerate comes to the surface over most of this area, and the ground rises gradually from the western end, culminating in the high narrow ridge of Hemlock Hill. The western portion, on both sides of Bussey Street, is occupied by deciduous woods, but over the higher and more rugged parts, a coniferous forest, mostly of Hemlock (*Tsuga canadensis*) but with a small percentage of White Pine in places, holds sway.

On rocky ledges and on shaded bluffs and steep slopes in the Oak woods are found False Solomon's Seal (*Smilacina racemosa*), Horse Gentian (*Triosteum aurantiacum*), Wild Licorice (*Galium circaeazans*) and the pretty pink-flowered Milkweed, *Asclepias quadrifolia*. The Hay-scented Fern and the Marginal Shield Fern grow on the faces of the conglomerate ledges or from clefts and banks along ravines.

At the abandoned quarry just south of Bussey Street and near the crossing to Peters Hill, and in the rubble and waste ground about it, many weedy plants have sprung up, some of which are uncommon in the Boston

area. Amongst the species collected here were *Panicum capillare*, *Echinochloa crus-galli*, *Setaria glauca*, *S. italica*, *Amaranthus hybridus*, *A. graecizans*, *Polygonum aviculare*, *Chenopodium album*, *C. ambrosioides*, *C. urbicum*, *Bassia hyssopifolia*, *Trifolium arvense*, *Vicia angustifolia*, *Lychnis alba*, *Lepidium campestre*, *L. virginicum*, *Brassica oleracea*, *Erysimum cheiranthoides*, *Sisymbrium officinale*, *S. altissimum*, *Solanum nigrum* and *Physalis heterophylla* var. *ambigua*. This assemblage of plants obviously has no connection with the native flora of the woods, and some of the species will probably disappear when the quarry site is used for other purposes than that of a dumping and incinerating ground, as at present.

Along the steep rocky slopes of Hemlock Hill, and especially on the south side, the native flora has been less disturbed than in any other part of the Arboretum, and for this reason a number of interesting plants found here are restricted to the locality.

Towards the base of the exposure along the south side where the conglomerate was worn down by the action of the glacier it presents a steep bare slope for some distance just within the Arboretum wall and above Bussey Street. Higher up the slope, great blocks and ledges stand out at intervals above the general level, the originally stratified beds having been tilted and faulted in a complex manner. There is a mingling here of the Conifers and the deciduous trees, and the open character of the woods permits the growth of a variety of shrubs and herbaceous species. The Hemlock is found well down the slopes and it becomes the dominant tree over most of the small plateau that occupies the top of the hill, while towards the eastern end and on the steep north exposures it grows as a dense pure stand almost to the exclusion of all other species. There are some large specimens of White Pine in the open woods, and other woody species are *Juniperus virginiana*, *Carya ovalis*, *Quercus alba*, *Q. borealis* var. *maxima*, *Q. velutina*, *Fagus grandifolia*, *Betula letua*, *B. populifolia*, *Rhus hirta*, *R. Toxicodendron*, *Vaccinium pennsylvanicum*, *Berberis vulgaris* and *Viburnum acerifolium*. The Columbine (*Aquilegia canadensis*) is growing on some of the rocks, and in more shaded places the common Polypody (*Polypodium virginianum*) is found. There is virtually no undergrowth of shrubs or herbaceous plants in the denser parts of the Hemlock woods. The thick foliage of the closely interlocking branches casts a dense shade, and the ground is thickly carpeted with the small dry leaves. The trees grow in close formation and the gloom and silence and absence of verdure or other evidence of life under the dark canopy supported by the column-like trunks is solemn and impressive.

Towards the east end of the ridge on the south side the rock is more broken and a talus of loose fragment has accumulated in places under the small cliffs formed by the outstanding masses of conglomerate. A number of interesting plants grow here amongst the rocks and at various levels on the slope. Some of the species found in this locality are *Andropogon scoparius* var. *frequens*, *Sorghastrum nutans*, *Panicum dichotomiflorum*,

Danthonia compressa, *Carex anceps*, *Baptisia tinctoria*, *Desmodium rigidum*, *D. marilandicum*, *D. rotundifolium*, *D. nudiflorum*, *Lespedeza frutescens*, *Asclepias quadrifolia*, *Aureolaria pedicularia*, *A. flava*, *Eupatorium aromaticum*, *E. sessilifolium*, *Helianthus divaricatus*, *Aster undulatus*, *A. lateriflorus*, *A. macrophyllus*, *Solidago juncea*, *S. caesia*, *Hieracium venosum*, *H. scabrum* and *H. paniculatum*. At the foot of the hill and not far back from the brook *Scutellaria altissima* is growing amongst the rocks, and near the same place the Maidenhair Fern (*Adiantum pedatum*) was found. The last two plants are both quite rare, and the fern may have been planted here. The Lily of the Valley (*Convallaria majalis*) is another introduced plant growing on the shady slopes nearby.

A considerable part if not all of Peters Hill was originally covered with deciduous woods, part of which was probably cleared away at an early day so as to bring the land under cultivation or pasturage. Just within the Arboretum grounds, near Walter Street, is included part of an old burying ground, in which some of the tomb-stones date back to pre-revolutionary days. Stumps of some large Oaks, apparently remnants of the early forest, are to be seen here, some of the trees having been cut down only a few years ago. On the north and east slopes of the hill several large White Oaks were standing amongst the Crataegus plantation within the last few years, but only a single specimen now remains. The only part of the hill on which a fragment of the native woods has been preserved is just below the summit as it slopes off to the east.

There is no outcropping of the conglomerate on Peters Hill, with the possible exception of a few small masses protruding on the north slopes, which may either be detached fragments or part of a ledge. There can be no doubt, however, that this formation is present and forms the core of the hill below the deposits of glacial clay and gravel.

Although the wooded area on Peters Hill is very limited, it contains quite a variety of trees and shrubs. The following species were noted here, some of the normally arborescent ones, like the Chestnut and Butternut, being represented only by sprouts: *Carya ovalis*, *Juglans cinerea*, *Betula papyrifera*, *B. populifolia*, *Quercus alba*, *Q. velutina*, *Q. borealis* var. *maxima*, *Castanea dentata*, *Ulmus americana*, *Sassafras officinale*, *Berberis vulgaris*, *Spiraea latifolia*, *Rosa virginiana*, *Rubus argutus*, *R. occidentalis*, *Prunus serotina*, *Rhus glabra*, *R. Toxicodendron*, *Celastrus scandens*, *Acer rubrum*, *A. saccharum*, *Rhamnus cathartica*, *Cornus florida*, *C. racemosa*, *Vaccinium vacillans*, *V. pennsylvanicum*, *Fraxinus americana*, *Viburnum Lentago*, and *V. acerifolium*. Amongst herbaceous plants the variety is not very great and only a few species occur that have not been mentioned previously. One of the most interesting of these is the Coral-root Orchid (*Corallorrhiza maculata*), a specimen of which was collected in September, 1925, well up on the slope in a thicket of young Oaks. Lower down towards the edge of the woods the Wild Geranium or Cranesbill (*Geranium maculatum*), the Mountain Mint (*Pycnanthemum flexuosum*) and the Purple Milkweed (*Asclepias purpurascens*) are growing.

The large collection of *Crataegus* occupies most of the cleared slopes of the hill and in the open spaces between these small trees many herbaceous plants flourish. The flora has doubtless been much changed and many plants have disappeared since the clearing away of the woods, but the prairie-like aspect of parts of the slope and the assemblage of plants growing here strongly suggests that the forest did not at any time completely cover it and that part of it was originally occupied by open glades or meadows. Some of the more characteristic and conspicuous plants of the open slopes are: *Stipa avenacea*, *Andropogon scoparius* var. *frequens*, *Agrostis perennans*, *A. hyemale*, *Arrhenatherum elatus*, *Danthonia spicata*, *Smilacina stellata*, *Rumex acetosella*, *Hypericum perforatum*, *Helianthemum canadense*, *H. Bicknellii*, *Lechea villosa*, *Oenothera biennis*, *Asclepias syriaca*, *Trichostema dichotomum*, *Solidago bicolor*, *S. juncea*, *S. nemoralis*, *S. graminifolia*, *Aster patens*, *A. dumosus*, *A. vimineus*, *A. linearifolius*, *Gnaphalium obtusifolium*, *G. uliginosum*, and *Erigeron ramosus*. Late in the autumn the Asters and Goldenrods often make a brilliant display, *Aster linearifolius*, with its pretty violet rays and yellow discs, being especially abundant and showy.

Besides the plants growing in association at the localities mentioned above, a number of other species worthy of mention have been collected in various parts of the Arboretum. *Cyperus filiculmis* grows rather abundantly on sterile gravelly banks between the Arborway wall and the Shrub Collection; this sedge has also been found in some of the cultivated beds in the Conifer Collection and elsewhere, where it has a more robust appearance. *Plantago aristata* and *Antennaria neodioica* are also growing on the same banks above the shrubs, and the little orange-flowered Hawkweed, or Devil's Paint-brush (*Hieracium aurantiacum*) is found on the grassy paths a little lower down amongst the shrubs. Pinesap (*Monotropa Hypopitys*) is a rarity that has been collected in the Oak Collection, and the Wood Betony (*Pedicularis canadensis*) and the Ground-pine (*Lycopodium obscurum* var. *dendroides*) are known only from one locality above the Laurel along the base of Hemlock Hill. The Beard-tongue (*Pentstemon laevigatus*) is growing sparingly in the lower ground a little farther west and near the Bussey Street wall, where it may have been accidentally introduced or planted. The Ironweed (*Vernonia noveboracensis*) sends up its tall stems to a height of seven or eight feet amongst the shrubs to the west of the Meadow Road, near the Aesculus group, and its panicles of rich purple flowers are quite conspicuous in the late summer. The little Skullcap (*Scutellaria epilobifolia*) is growing in the shade of the Rose bushes along the border between the Meadow Road and the ponds, near the Forest Hills gate, and the Moth Mullen (*Verbascum Blattaria*) has been found amongst the shrubs on the Overlook.

Amongst curious instances of plants unaccountably introduced from distant regions may be mentioned the Chili Tarweed (*Madia sativa* var. *congesta*) a native of the Pacific coast of South America, and now established

as a weed along the coast in Oregon and California, and *Bassia hyssopifolia*, from the region of the Caucasus. The Composite first mentioned, came up several years ago in cultivated beds along the meadow Road, not far from the Administration Building, where it bloomed and produced seeds, but it does not seem to have persisted here. The species of *Bassia* was collected at the old quarry near Bussey Street, where it is growing amongst the weeds.

In bits of open meadow and in many of the planted groups where the ground is not cultivated and there is considerable space between the trees, as is the case amongst the Lindens, Elms and Birches, where the grass and other undergrowth is cut at infrequent intervals, an opportunity is afforded for the growth of many spontaneous plants. Common species of such places are the Meadow Buttercup (*Ranunculus acris*), Queen Anne's Lace, Butter and Eggs (*Linaria canadensis*), Self-heal (*Prunella vulgaris*), English Rib-grass, (*Plantago lanceolata*), Ox-eye Daisy, Chickory, Yarrow, Dandelion (*Taraxacum erythrospermum*) and Fall Dandelion (*Leontodon autumnalis*). Local and less frequent are the European Bellwort (*Campanula rapunculoides*), White Campion (*Silene alba*), Cow Vetch (*Vicia Cracca*), Black Knapweed (*Centaurea nigra*) and Canada Thistle (*Cirsium arvense*).

At places amongst the Oaks, Hickories, Walnuts and other groups the grass and other plants are usually allowed to grow undisturbed until late in the season, and some of the native plants as well as other introduced ones have a better chance to survive. In the late summer and fall the bright yellow flowers of the Dyer's Greenwood (*Genista tinctoria*), with several species of Goldenrod, and the purple paniced flowers of the New England Aster and other species make a brilliant display. The tall Milkweed, *Asclepias syriacus*, is also abundant here, and the Hardhack (*Spiraea tomentosa*), Wild Rose (*Rosa carolina*), the pretty purple-flowered *Rubus odoratus*, and several less conspicuous brambles grow amongst the tall grass.

In the beds and borders occupied by planted shrubs the ground is usually cultivated at least once or twice a year, and in such places a variety of annual plants, most of them of a weedy character, spring up. Some of the common species here are *Poa annua*, *Setaria glauca*, *Polygonum Persicaria*, *P. pennsylvanicum*, *Chenopodium album*, *Mollugo verticillata*, *Stellaria media*, *Cerastium vulgare*, *C. arvense*, *Lepidium virginicum*, *Raphanus Raphanistrum*, *Barbarea vulgaris*, *Euphorbia maculata*, *Linaria canadensis*, *Plantago Rugelii*, *Galinsoga parviflora* var. *hispida* and *Senecio vulgaris*. Many other species besides those enumerated are found in the cultivated ground, and the total number that might be collected is perhaps larger than in any other single environment.

The Catalogue of the Spontaneous Plants of the Arboretum given below is largely the result of desultory collecting and observation during the past six years. Collections made by the author are indicated by the

serial number attached to them, and those contributed by others are credited to them in the list. Many of the species were collected more than once and were duplicated by different collectors. In such cases the specimen kept for the herbarium is mentioned. The work has been rather unevenly balanced as to seasons, since frequent absence on collecting trips in other parts of the country has made it impossible for the author to find some of the plants in flower or fruit. For this reason the spring flora has been somewhat neglected, and it is perhaps less thoroughly known and represented than that of the later seasons.

Several members of the staff and persons connected with the Arboretum, as well as others, have taken a considerable interest in the work and have made contributions to it, either in the collecting of specimens, the identification of material, or suggestions and aid in preparing the list.

Mr. Frederic W. Grigg, who was at the Arboretum in 1925 and 1926, rendered much aid in preparing the preliminary list and in assisting in the determination of a number of the plants. Because of his careful study and wide knowledge of the local flora, I at one time, invited him to join me in the preparation and authorship of this paper, and the work would doubtless have profited much by his assistance had it been possible for him to have given the time to it.

Miss Caroline K. Allen, while at the Arboretum in 1927, collected a number of specimens of herbaceous plants, some of which are cited in the list. Amongst these are a few that had not been found previously, including the Cardinal flower (*Lobelia cardinalis*), collected along the margin of one of the ponds near the Shrub Collection, and the Wood Lily (*Lilium philadelphicum*), found on the wooded hills near the Maple group.

Amongst others who have aided by the contribution of spontaneous plants or by calling attention to those now growing in the Arboretum, or to species which formerly grew there, are Professor J. G. Jack, Mr. Alfred Rehder, Mr. W. H. Judd, Mr. Geo. M. Merrill and Mr. Percival H. Wardwell.

To Mr. C. A. Weatherby, of the Gray Herbarium, I am under considerable obligation for his valuable aid and expenditure of much time in determining and checking up a number of doubtful species. I also wish to express my thanks to Mr. Alfred Rehder, Curator of this herbarium, for many suggestions and aid in the course of the work.

It is planned to keep the plants of the Spontaneous Flora as a special collection in the Herbarium of the Arnold Arboretum, so that additions to it can be made from time to time, and as additional plants turn up it may be desirable to publish a supplementary list at some time in the future.

The Spontaneous Flora of the Arnold Arboretum, being a part, limited by ecological conditions, of that of eastern Massachusetts, lies in a region well covered by the Manuals. Since most of the area has been under cultivation, grazing, clearing or other artificial disturbances for many years, the

native flora had naturally been much modified and depleted even before the establishment of the Arboretum. It is also constantly receiving additions through the introduction of plants from other regions, most of them being common weeds and grasses, but including some unusual species and a few that are new to the local flora.

It would have been most interesting and valuable as a basis for comparison had a list of the spontaneous plants growing in the area been made at the time of the Arboretum was established, more than fifty years ago. No such list is now available, and I am not aware that anything has been written dealing particularly with the flora of the Arboretum, nor that much collecting of the spontaneous plants has been done.

It is fortunate, however, that we can refer at least to a list of the trees and shrubs found in the Arboretum at the time of its establishment. In this catalogue, published as a part of the First Report of the Director, Professor Charles S. Sargent, in 1874, the species not growing spontaneously were indicated by an asterisk (*), and I am appending a copy of the list, excluding these. In some cases where changes have been adopted in the use of names or in a few instances where a species other than the one indicated is known to have been referred to, I have inserted the presently accepted or correct name in parentheses.

SPONTANEOUS SPECIES LISTED IN A CATALOGUE OF THE LIG-
NEOUS PLANTS GROWING IN THE ARNOLD ARBORETUM,
SEPTEMBER 1, 1874, FROM THE REPORT OF THE
DIRECTOR, CHARLES S. SARGENT.

Clematis virginiana L. Not now known as a spontaneous plant.

Berberis vulgaris L.

Tilia americana L. (*T. glabra* Vent.)

Rhus glabra L.

Rhus copallina L. Not now found spontaneous.

Rhus venenata DC. (*R. vernix* L.). Not now found spontaneous.

Rhus Toxicodendron L.

Rhamnus cathartica L.

Ceanothus americanus L.

Celastrus scandens L.

Acer Saccharinum L. (*A. saccharum* Marsh).

Acer rubrum L.

Caragana frutescens DC. Probably not spontaneous.

Robinia pseudoacacia L. Not now found spontaneous.

Prunus virginiana L.

Prunus serotina Ehrh.

Spiraea salicifolia L. (*S. latifolia* Borkh.)

Spiraea tomentosa L.

Rubus strigosus Michx. (*R. Idaeus* var. *strigosus* (Michx.) Maxim.)

Rubus occidentalis L.

- Rubus canadensis* L.
Rubus hispidus L.
Rosa lucida Ehrh. (*R. virginiana* Mill.)
Rosa carolina L.
Crataegus tomentosa L. (Probably *C. Arnoldiana* Sarg.)
Amelanchier canadensis var. *Botryapium* Gray (*A. laevis* Wieg.)
Pyrus americana DC. (*Sorbus americana* Marsh. or more probably *Sorbus Aucuparia* L.) Not now known spontaneous in the Arboretum.
Hamamelis virginica L. (*Hamamelis virginiana* L.)
Cornus alternifolia L. Not found as a spontaneous plant recently.
Cornus paniculata L'Her. (*C. racemosa* Lam.)
Cornus florida L.
Sambucus canadensis L.
Viburnum Lentago L.
Viburnum dentatum L.
Viburnum acerifolium L.
Lonicera ciliata Muhl. (*L. canadensis* Marsh.) Not recently found.
Cephalanthus occidentalis L.
Gaylussacia frondosa Torr. & Gray. Not now found spontaneous.
Gaylussacia resinosa Torr. & Gray. (*G. baccata* (Wang.) K. Koch.)
Vaccinium pennsylvanicum Lam.
Vaccinium corymbosum L.
Vaccinium macrocarpon Ait. Not recently found.
Gaultheria procumbens L.
Andromeda ligustrina Muhl. (*Xolisma ligustrina* (L.) Britton). Not recently found.
Azalea viscosa L. (*Rhododendron viscosum* (L.) Torr.) Not now found spontaneous.
Ilex verticillata Gray. Not now growing spontaneously.
Fraxinus americana L.
Lindera benzoin Meisner (*Benzoin aestivale* (L.) Nees) Not known to be growing spontaneously now.
Platanus occidentalis L. No spontaneous trees now known.
Juglans cinerea L.
Carya alba Nutt. (*C. ovata* (Mill.) K. Koch.)
Carya tomentosa Nutt. (*C. alba* (L.) K. Koch.)
Carya porcina Nutt. (*C. ovalis* (Wang.) Sarg.)
Carya amara Nutt. (*C. cordiformis* (Wang.) K. Koch.) Not now found spontaneous.
Quercus alba L.
Quercus bicolor Willd.
Quercus ilicifolia Wang.
Quercus coccinea var. *tinctoria* Gray (*Q. velutina* Lam.)
Castanea vesca L. (Doubtless *C. dentata* (Marsh.) Borkh.)
Fagus ferruginea Ait. (*F. grandifolia* Ehrh.)

Corylus americana Walt.

Ostrya virginica Willd. (*O. virginiana* (Mill.) K. Koch.)

Carpinus americana Michx. (*C. caroliniana* Walt.) Not found native recently.

Myrica cerifera L. (Doubtless *M. carolinensis* Mill.)

Comptonia asplenifolia Ait.

Betula lenta L.

Betula alba var. *populifolia* Spach. (*B. populifolia* Marsh.)

Alnus incana Willd.

Salix—sp.? (Probably *S. tristis* Ait.)

Salix—sp.? (Perhaps *S. discolor* Muhl.)

Populus tremuloides Michx. Not now known as a spontaneous plant.

Populus grandidentata Michx.

Pinus rigida Mill.

Pinus Strobus L.

Abies nigra Poir. (*Picea mariana* (Mill.) B.S.P.) Probably erroneously included in the spontaneous list.

Abies balsamea Marsh. Probably not spontaneous.

Abies canadensis Michx. (*Tsuga canadensis* (L.) Carr.)

Juniperus virginiana L.

Juniperus Sabina var. *procumbens* Pursh. (Probably *J. communis* var. *depressa* Pursh.) Not now found spontaneous.

Smilax rotundifolia L.

Smilax herbacea L.

ENUMERATION OF PLANTS GROWING SPONTANEOUSLY IN THE ARNOLD ARBORETUM.¹

Polypodiaceae

Polypodium virginianum L. (*P. vulgare* of authors, not L.). COMMON POLYPODY. No. 25617. Found sparingly on conglomerate ledges on Hemlock Hill and in Central Woods.

Adiantum pedatum L. MAIDENHAIR FERN. No. 25716. Collected at base of Hemlock Hill on southeast side. Only one clump was seen and it may have been planted here, although it is probable that the species was once native in the Arboretum.

Pteridium aquilinum (L.) Kuhn var. *latiusculum* (Desv.) Underw. BRACKEN. No. 23631. Common in open woods and rocky ground.

Athyrium angustum (Willd.) Presl (*Asplenium Filix-femina* (L.) Bernh. in part). LADY FERN. No. 35055. Frequent along brooks and borders of woods. Probably planted in some places but the species is undoubtedly native within the Arboretum.

¹ Introduced species are marked by an asterisk (*), and a few native plants of which we have authentic records but which are now extinct in the Arboretum, have been included in the list and are designated by a dagger (†).

The names adopted in the list are those currently used at the Arnold Arboretum or at the Gray Herbarium, and synonyms are cited only where those adopted are not found in Gray's Manual, 7th edition, either as a valid name or as a synonym.

Athyrium angustum var. *rubellum* (Gilbert) Butters (*Asplenium Filix-femina* (L.) Bernh. in part). No. 25717. This and the next variety grow in similar situations to the typical form.

Athyrium angustum var. *elatus* (L.) Butters (*Asplenium Filix-femina* (L.) Bernh. in part). No. 35051.

Thelypteris noveboracensis (L.) Nieuwland (*Aspidium noveboracense* (L.) Sw.). NEW YORK SHIELD FERN. No. 35053. Low ground and borders of woods at several localities.

Thelypteris Bootii (Tuckerm.) Nieuwland. (*Aspidium Bootii* Tuckerm.). No. 35052. Borders of paths and margins of woods, low ground at foot of hills, North Woods.

Thelypteris palustris (L.) Schott. (*Aspidium Thelypteris* (L.) Sw.) MARSH SHIELD FERN. Nos. 23621, 25866. Common in wet ground in several localities.

Thelypteris marginalis (L.) Nieuwland (*Aspidium marginale* (L.) Sw.). MARGINAL SHIELD FERN. No. 25585; *E. L. Evinger*. On rocky ledges, Hemlock Hill and other localities on conglomerate outcrops.

Dennstaedtia punctilobula (Michx.) Moore. HAY-SCENTED FERN. No. 23608. Dry banks and rocky ledges at several places in Arboretum.

Onoclea sensibilis L. SENSITIVE FERN. No. 35137a. Frequent in wet meadows and about brooks and ponds.

**Pteritis nodulosa* (Michx.) Nieuwland (*Onoclea Struthiopteris* Am. auth., not Hoffm.). OSTRICH FERN. No. 35004. Low ground between North Woods and Meadow Road, and in Rhododendron beds along brook at base of Hemlock Hill.

Osmundaceae

Osmunda regalis L. var. *spectabilis* (Willd.) Gray. ROYAL FERN. No. 28023; *C. K. Allen*. Abundant along brooks and borders of woods throughout Arboretum.

Osmunda Claytoniana L. INTERRUPTED FERN. No. 23513. Rich and moist ground along brooks and borders of woods.

**Osmunda cinnamomea* L. CINNAMON FERN. No. 37743. Banks along Bussey Brook. Not common and probably introduced.

Marsileaceae

Marsilea quadrifolia L. PEPPERWORT. No. 23579. Shallow water and muddy margins of pond, near Forest Hills entrance. Perhaps introduced.

Equisetaceae

Equisetum arvense L. HORSETAIL. Nos. 25594, 35012. Common in low meadows, borders of ponds and sometimes along dry paths.

Equisetum sylvaticum L. No. 27985. Boggy and springy ground, near base of Peters Hill.

Equisetum limosum L. No. 25902. Muddy margins of pond, south side of road near Forest Hills entrance.

Lycopodiaceae

Lycopodium obscurum L. var. *dendroideum* (Michx.) D. C. Eaton.

GROUND-PINE. *E. L. Evinger*. Rare and local. Shaded north slopes of Hemlock Hill, above Laurels.

Lycopodium complanatum L. var. *flabelliforme* Fernald. TRAILING GROUND-PINE. No. 35101. Rare and local, in springy meadow along Bussey Brook.

Pinaceae

Pinus Strobus L. WHITE PINE. No. 37700. Native on Hemlock Hill and perhaps elsewhere in the Arboretum.

Pinus rigida Mill. PITCH PINE. No. 36326. On outcrops of Roxbury conglomerate.

Tsuga canadensis (L.) Carr. HEMLOCK. No. 37699. Locally dominant on top and rocky slopes of Hemlock Hill.

Juniperus virginiana L. RED CEDAR. No. 37691. On conglomerate outcrops, Central Woods and Hemlock Hill.

Sparganiaceae

Sparganium eurycarpum Engelm. BUR-REED. Nos. 23611, 25657a. About borders of pond, near Forest Hills entrance.

Najadaceae

Potamogeton foliosus Raf. PONDWEED. Nos. 25643, 36342. In ponds near Forest Hills entrance and on South Street tract.

Alismaceae

Sagittaria latifolia L. ARROW-HEAD. *C. K. Allen*. Wet meadows and borders of ponds.

Sagittaria latifolia f. *obtus*a (Muhl.) Robinson. No. 28096. In similar situations to the typical form and perhaps more common.

Sagittaria latifolia f. *gracilis* (Pursh) Robinson. No. 28202. Wet meadows near Administration Building.

Alisma plantago-aquatica L. WATER PLANTAIN. *C. K. Allen*. Wet meadows and borders of ponds.

Graminae

Andropogon scoparius Michx. var. *frequens* Hubbard. BEAR GRASS. No. 23528. Frequent in dry open ground and in rocky open woods.

Sorghastrum nutans (L.) Nash. INDIAN GRASS. No. 25119. Uncommon and local on rocky slopes, southeast side of Hemlock Hill.

**Digitaria sanguinalis* (L.) Scop. CRAB GRASS. No. 23590. A common weed in cultivated beds and waste ground.

**Digitaria Ischaemum* Schreb. (*D. humifusa* Pers.). Nos. 23636, 28174. Frequent in cultivated and waste ground.

- Paspalum pubescens* Muhl. Nos. 28167, 28225. Local in meadows south-east of Peters Hill, in Poplar collection.
- Panicum capillare* L. OLD-WITCH GRASS. No. 25983. A frequent weed in cultivated and waste ground.
- **Panicum miliaceum* L. MILLET. No. 28161. Uncommon. Collected in rich ground, South Street tract.
- Panicum depauperatum* Muhl. Nos. 25627, 37671. Locally common on conglomerate outcrops. This and various other species of the genus are popularly called Panic Grasses, but most of them are not distinguished by common names.
- Panicum linearifolium* Scribn. var. *Weneri* (Scribn.) Fernald (*P. Weneri* Scribn.). No. 25630, 28046. Dry rocky woods and ledges.
- Panicum dichotomum* L. Nos. 23529, 25803. Dry open woods and rocky slopes.
- Panicum barbulatum* Michx. No. 25616. Uncommon in rocky woods, near Hemlock Hill.
- Panicum boreale* Nash. No. 28153. Rocky open woods, south of Bussey Street.
- Panicum Lindheimeri* Nash var. *fasciculatum* (Torr.) Fernald (*P. tennesseense* Ashe). Nos. 25682, 27961. Frequent in open woods at various places in the Arboretum.
- Panicum Lindheimeri* var. *implicatum* (Scribn.) Fernald (*P. implicatum* Scribn.). Nos. 28112a, 34990. Woods and open rocky ground and sometimes also found in cultivated beds.
- Panicum sphaerocarpon* Ell. Nos. 28013, 35057. Frequent in rocky open woods and also in cultivated beds.
- **Echinochloa crus-galli* (L.) Beauv. BARNYARD GRASS. Nos. 23601, 28102a. Frequent in cultivated beds and borders and in waste ground.
- **Echinochloa muricata* (Michx.) Fernald var. *microstachya* Wiegand. No. 28113. Uncommon. Collected in cultivated ground near Dawson nursery.
- **Setaria lutescens* (Weigel) Hubbard (*P. glauca* (L.) Beauv.). BRISTLY FOXTAIL GRASS. No. 25956. A common weedy grass of borders and waste ground.
- **Setaria viridis* (L.) Beauv. No. 25984. In similar places to the last species and about as common.
- **Setaria italica* (L.) Beauv. HUNGARIAN GRASS. No. 28104a. Occasionally introduced in cultivated and waste ground.
- **Setaria verticillata* (L.) Beauv. FOXTAIL GRASS. No. 28103a. Uncommon in waste ground, South Street tract.
- Leersia virginica* Willd. WHITE GRASS. No. 28239. Moist or muddy margins of ponds or brooks.
- Leersia oryzoides* (L.) Sw. RICE CUT-GRASS. No. 23605. Wet meadows and borders of ponds and brooks.
- Phalaris arundinacea* L. CANARY GRASS. No. 2 5729. Locally abundant along margins of brooks.

- **Anthoxanthum odoratum* L. SWEET VERNAL GRASS. No. 23430. Common in meadows.
- Stipa avenacea* L. BLACK OAT GRASS. Nos. 25707, 27959. Locally frequent in open rocky ground along southeast side of Hemlock Hill, and on Peters Hill.
- Muhlenbergia mexicana* (L.) Trin. SATIN GRASS. Nos. 35154, 36333. Found in meadows and waste ground at several places, but not abundant.
- Muhlenbergia Schreberi* J. F. Gmel. NIMBLE WILL. No. 35155; *Grigg & Palmer*. Abundant in partially shaded ground and meadows.
- **Phleum pratense* L. TIMOTHY. No. 23474. Frequent in meadows and open ground.
- **Alopecurus pratensis* L. MEADOW FOXTAIL. Nos. 28108a, 37668. Frequent in wet meadows and along borders of brook.
- Agrostis alba* L. WHITE BENT GRASS. Nos. 25923, 25960. Common in various situations throughout the Arboretum. It is likely that more than one variety of this species is growing here.
- Agrostis hyemalis* (Walt.) B. S. P. HAIR GRASS. No. 25764. Occasional in cultivated or dry open ground.
- Agrostis perennans* (Walt.) Tuckerm. THIN GRASS. Nos. 23572, 28047. Common in dry open ground.
- Calamagrostis canadensis* (Michx.) Beauv. BLUE-JOINT GRASS. Nos. 25704, 37667a. Low meadows and borders of ponds and streams.
- Cinna arundinacea* L. WOOD REED GRASS. Nos. 25933, 28187. Moist ground, borders of ponds and brooks.
- **Ginnania lanata* (L.) Hubbard (*Holcus lanatus* L.). VELVET GRASS. Nos. 25555, 25721. Abundant in wet meadows.
- **Sphenopholis pallens* (Spreng.) Scribn. No. 37667. Rare in borders and waste ground.
- Sphenopholis obtusata* (Michx.) Scribn. Nos. 28031, 35007. Found in rich open ground at several places. Perhaps introduced.
- **Avena sativa* L. OATS. No. 37696. Not uncommon in cultivated and waste ground.
- **Arrhenatherum elatius* (L.) Beauv. OAT GRASS. Nos. 25659a, 28039. Local on gravelly slopes of Peters Hill and in rocky open woods, south side of Hemlock Hill.
- Danthonia compressa* Aust. WILD OAT GRASS. No. 25807. Rocky open woods, Hemlock Hill.
- Danthonia spicata* (L.) Beauv. Nos. 25708, 35077. Frequent in rocky open ground and woods, and sometimes found in cultivated beds.
- **Eragrostis capillaris* (L.) Nees. LOVE GRASS. No. 28105a. Rich open ground, South Street tract. Uncommon.
- **Eragrostis caroliniana* (Spreng.) Scribn. (*E. pilosa* (L.) Beauv.) No. 25969. Not rare in cultivated and waste ground.
- **Dactylis glomerata* L. ORCHARD GRASS. Nos. 23448, 35164. Abundant in meadows and waste ground.

- **Poa annua* L. LOW SPEAR GRASS. Nos. 25703, 28178. Common in cultivated and waste ground. One of the earliest plants to bloom in spring, and specimens may be found in flower or fruit almost throughout the year.
- **Poa compressa* L. CANADA BLUE GRASS. Nos. 23617, 28029. Common in meadows and waste ground throughout the Arboretum.
- Poa pratensis* L. KENTUCKY BLUE GRASS. No. 35156. Frequent in meadows.
- Poa palustris* L. (*P. triflora* Gilib.). FOWL MEADOW GRASS. Nos. 25751, 28106a. Locally abundant along margins of brook and occasionally found in waste or cultivated ground.
- Glyceria canadensis* (Michx.) Trin. RATTLESNAKE GRASS. No. 23499. Uncommon in moist ground along brook.
- Glyceria laxa* Scribn. NORTHERN MANNA GRASS. Nos. 25681a, 27993. Rather frequent about margins of ponds and in wet meadows.
- Glyceria stricta* (Lam.) Hitchc. (*G. nervata* (Willd.) Trin.). MANNA GRASS. Nos. 25681, 28162. Frequent in wet meadows and on borders of ponds and brook.
- Glyceria grandis* Wats. REED MEADOW GRASS. Nos. 25008, 28065. Frequent in wet meadows and about ponds.
- Glyceria pallida* (Torr.) Trin. PALE MANNA GRASS. Nos. 25673, 28155. Uncommon on muddy margins of ponds.
- Glyceria acutiflora* Torr. No. 25825. Uncommon in wet ground about ponds.
- Festuca rubra* L. RED FESCUE GRASS. Nos. 27979, 28049. Local in boggy ground about spring, near Peters Hill.
- Festuca ovina* L. var. *capillata* (Lam.) Hack. SHEEP'S FESCUE. No. 28072. Dry rocky slopes and ledges, southeast side of Hemlock Hill. Rare.
- **Festuca elatior* L. TALL MEADOW FESCUE. Nos. 28048, 37670. Not uncommon in waste and cultivated ground.
- **Bromus secalinus* L. CHESS. No. 28164. Uncommon in waste and cultivated ground.
- **Bromus tectorum* L. DOWNY BROME GRASS. No. 25659. Rather frequent in waste ground and borders.
- **Bromus sterilis* L. No. 37711. Not as common as the last species, but growing in similar situations.
- **Lolium perenne* L. RYE GRASS. Nos. 28176, 37716. Frequent in waste ground and meadows.
- **Lolium multiflorum* Lam. ITALIAN RYE GRASS. No. 25702a. Uncommon in meadows and cultivated ground.
- **Agropyron repens* (L.) Beauv. COUCH GRASS. No. 23484, 28107a. Frequent in meadows and waste ground.
- **Agropyron tenerum* Vasey. No. 25596. Uncommon in waste ground.
- **Hordeum jubatum* L. SQUIRREL-TAIL GRASS. No. 37712. Uncommon in waste ground. Collected at old quarry, near Bussey Street.

**Secale cereale* L. RYE. No. 37697. Not uncommon in waste ground and cultivated beds.

Cyperaceae

Cyperus strigosus L. Nos. 23654, 28214. Abundant in wet meadows and sometimes also found in cultivated beds and borders. The species of *Cyperus* are popularly called SEDGES, but few of the species have distinctive common names.

Cyperus strigosus var. *compositus* Britton. Nos. 25936, 28185. Growing with the typical form and about as common.

Cyperus filiculmis Vahl. No. 25964. Locally abundant on dry gravelly bank, between Shrub collection and Arborway wall.

Cyperus filiculmis var. *macilentus* Fernald. Nos. 25358, 28009. Rocky and gravelly ground, and sometimes also in cultivated beds.

Eleocharis obtusa (Willd.) Schultes. SPIKE RUSH. Nos. 25865, 35152. Common in wet meadows and on muddy margins of ponds and brooks.

Eleocharis palustris (L.) R. & S., var. *major* Sonder. No. 25645. Muddy margins of ponds, submerged in wet seasons.

Eleocharis calva Torr. (*E. palustris* var. *glaucescens* (Willd.) Gray). No. 25906. Muddy ground about ponds.

Eleocharis acicularis (L.) R. & S. No. 23585. Muddy margins of ponds, submerged in wet seasons.

Eleocharis capitata (L.) R. Br. (*E. tenuis* (Willd.) Schultes). Nos. 25615, 28042. Wet springy ground and borders of ponds.

Stenophyllus capillaris (L.) Britton. Nos. 25899, 35059. Frequent in moist sandy ground and in cultivated beds.

Scirpus atrovirens Muhl. No. 28244. Frequent in wet meadows. The species of *Scirpus* are popularly called CLUB RUSHES or BULLRUSHES, but few of them have distinctive names.

Scirpus cyperinus (L.) Kunth. WOOL GRASS. Nos. 23500, 28248. Frequent in wet meadows and along margins of brooks and ponds.

Scirpus atrocinctus Fernald, f. *brachypodus* (Fernald) Blake. No. 25557. Wet meadows along Bussey Brook.

Scirpus polyphyllus Vahl. No. 36108. Low meadow, near Administration Building.

Rhynchospora capillata (Michx.) Vahl. Beak Rush. No. 28086a. Rare in wet meadow, between Meadow Road and Arborway wall, in Willow group.

Carex Bicknellii Britton. No. 37751. Meadows and open ground, but apparently not common. The Carices are generally known as SEDGES, but only a few of the more conspicuous species have distinctive common names.

Carex scoparia Schkuhr. Nos. 25547, 25759. Common in dry meadows and open rocky woods.

Carex scoparia var. *condensa* Fernald. No. 23478. Wet meadows and open ground.

- Carex tribuloides* Wahlenb. No. 28035. Moist rich ground. Not common.
- Carex mirabilis* Dewey. Nos. 25633, 28002. Frequent in moist meadows and sometimes in dry open ground.
- Carex echinata* Murr. Nos. 27976, 37723. Boggy ground about spring southeast side of Peters Hill. Local and uncommon.
- Carex rosea* Schkuhr. Nos. 25549, 25629. Frequent in open woods and dry meadows.
- Carex rosea* var. *radiata* Dewey. Nos. 28008, 28177. Grows in similar situations to the typical form, and about as common.
- **Carex muricata* L. Nos. 25739. Rather frequent in rocky open ground and in dry meadows.
- Carex Muhlenbergii* Schkuhr. No. 28215. Dry open ground and meadows.
- Carex cephalophora* Muhl. Nos. 27952, 28006. Abundant in dry open woods and meadows.
- Carex vulpinoidea* Michx. No. 25654. Wet meadows and margins of ponds.
- Carex stipita* Muhl. Nos. 25550, 28001. Frequent in wet meadows and along margins of brooks and ponds.
- Carex annectens* Bicknell. No. 25740. Uncommon along margins of brooks and ponds.
- Carex crinita* Lam. Nos. 25579, 28068. Wet meadows and margins of brook. Locally abundant and conspicuous.
- Carex stricta* Lam. No. 25548. Wet meadow near Administration Building.
- Carex virescens* Muhl. var. *Swanii* Fernald. Nos. 25607, 27992. Frequent in meadows and open woods.
- Carex pennsylvanica* Lam. Nos. 25602, 25632. Frequent in woods and rocky open ground.
- Carex panicea* L. No. 28075. Boggy ground about spring, southeast side of Peters Hill.
- Carex pallescens* L. Nos. 25597, 27991. Frequent in wet meadows and along brooks.
- Carex anceps* Muhl. Nos. 27957, 28005. Local in dry gravelly woods, near Aesculus group, and on rocky ledges and slopes, southeast side of Hemlock Hill.
- Carex blanda* Dewey. Nos. 2800, 28007. Rather common in meadows and open woods at several localities.
- Carex conoidea* Schkuhr. No. 25587. Uncommon in wet meadows and springy ground.
- Carex debilis* Michx. var. *Rudgei* Bailey. Nos. 25685, 28037. Frequent in wet meadows and along borders of brooks and ponds.
- Carex lanuginosa* Michx. Nos. 28038, 28074. Locally abundant in boggy ground about spring on southeast side of Peters Hill.
- **Carex hirta* L. Nos. 28069, 28091; *C. E. Faxon* (1878). Local in boggy

ground about spring, southeast side of Peters Hill. The specimen collected by Mr. Faxon is in the Gray Herbarium, and the locality given on label is "Peters Hill, West Roxbury."

Carex lurida Wahlenb. Nos. 23535, 25650. Locally abundant in wet meadows.

Araceae

Arisaema triphyllum (L.) Schott. JACK-IN-THE-PULPIT. No. 25889.

Moist shaded ground, along Meadow Road near Aesculus group, and on southeast side of Hemlock Hill.

Peltandra virginica L. ARROW ARUM. No. 25647. Wet margins of ponds near Forest Hills entrance.

Acorus Calamus L. CALAMUS. No. 27997. Occasional along margins of ponds and brooks.

Commelinaceae

Commelina communis L. DAY-FLOWER. No. 25736. Not uncommon in waste and cultivated ground, as a weed.

Pontederiaceae

Pontederia cordata L. PICKEREL-WEED. *C. K. Allen*. Abundant in shallow water and on muddy margins of ponds. Possibly introduced here.

Juncaceae

Juncus bufonis L. No. 25824. Locally abundant in wet meadow, near Administration Building. The species of this genus are generally called RUSHES or BOG RUSHES without distinction.

Juncus tenuis Willd. Nos. 23477, 23522. A very common weed in meadows and waste ground, in almost all sorts of soil.

Juncus effusus L. var. *solutus* Fernald & Wiegand. Nos. 23563, 27978. Common in wet meadows and along margins of brooks and ponds.

Juncus canadensis J. Gay. No. 25836. Uncommon in wet meadows.

Juncus acuminatus Michx. No. 25900. Occasional in moist open ground.

Juncus marginatus Rostk. No. 28175, 37721. Frequent in wet meadows.

Luzula campestris (L.) DC. var. *multiflora* (Ehrh.) Celak. WOOD RUSH. Nos. 23530, 23616. Common in dry rocky woods.

Liliaceae

Oakesia sessilifolia (L.) Wats. SMALL BELLWORT. Nos. 28015, 37746. Local along shaded banks, near Forest Hills entrance, and along Bussey Brook.

**Allium carinatum* L. WILD ONION. Nos. 28234, 37669. Locally abundant on dry banks along Bussey Brook, near Center Street gate, and above Forest Hills Road, and also in boggy ground, along Meadow Road, near Aesculus group.

**Allium vineale* L. GARLIC. Nos. 28060, 37727. Occasionally found in waste ground.

- **Hemerocallis fulva* L. DAY LILY. No. 25711. Meadows and open woods.
- Lilium philadelphicum* L. WOOD LILY. C. K. Allen. Rare in open woods and meadows, east of Meadow Road, near Maples, and in Central Woods, near Chestnuts.
- Lilium superbum* L. TURK'S-CAP LILY. No. 25794, C. K. Allen. Locally abundant in low meadow, near Administration Building, and occasionally found in other parts of the Arboretum. It is said to have been planted in the meadow, and perhaps is entirely introduced.
- Lilium canadense* L. WILD YELLOW LILY. No. 37717. Uncommon in low meadows and thickets.
- **Ornithogalum umbellatum* L. STAR OF BETHLEHEM. Well established in boggy ground at foot of hills, near Meadow Road and Aesculus group.
- **Asparagus officinalis* L. Common Asparagus. No. 25635. Occasional in meadows and waste ground.
- Smilacina racemosa* (L.) Desf. FALSE SPIKENARD. No. 35135. Frequent in dry open woods.
- Smilacina stellata* (L.) Desf. FALSE SOLOMON'S SEAL. No. 25997. Local on gravelly open slopes of Peters Hill, probably formerly covered with woods.
- Maianthemum canadense* Desf. FALSE LILY OF THE VALLEY. No. 25610. Abundant in dry open woods.
- Polygonatum biflorum* (Walt.) Ell. SOLOMON'S SEAL. Nos. 23514, 25625. Frequent at several places in woods.
- **Convallaria majalis* L. LILY OF THE VALLEY. Moist shaded ground at base of Hemlock Hill, on southeast side.
- Smilax rotundifolia* L. GREEN BRIAR. No. 36357. Abundant on rocky banks and borders of woods.
- Smilax herbacea* L. CARRION-FLOWER. No. 34105. Uncommon in rocky woods.

Amaryllidaceae

- Hypoxis hirsuta* (L.) Coville. STAR GRASS. Nos. 25559, 28044. Found in open woods and meadows at several localities, but nowhere abundant.

Iridaceae

- Iris versicolor* L. WILD BLUE FLAG. No. 23511. Abundant in wet meadows and about borders of ponds and brooks.
- **Iris pseudacorus* L. YELLOW IRIS. Nos. 25562, 25646. Abundant in wet meadows and about ponds.
- Sisyrinchium gramineum* Curtis. BLUE-EYED GRASS. Nos. 25560, 27982. Dry meadows and gravelly open ground, frequent.
- Sisyrinchium atlanticum* Bicknell. Nos. 25558, 27995. Locally common in wet meadows and in springy ground at several localities.

Orchidaceae

Habenaria lacera (Michx.) R. Br. RAGGED FRINGED ORCHIS. No. 28057; C. K. Allen. In meadows along Bussey brook, near Conifers. Uncommon.

Habenaria psychodes (L.) Sw. PURPLE FRINGED ORCHIS. No. 23531. Rare and local along margin of Bussey Brook.

Spiranthes Beckii Lindl. SMALL LADY'S TRESSES. Nos. 23665, 35037. Rare in meadows.

Spiranthes gracilis (Bigel.) Beck. SLENDER LADY'S TRESSES. Nos. 35048, 35070 In similar places to last species and more abundant.

Spiranthes cernua (L.) Richard. LADY'S TRESSES. Nos. 23671, 35122; C. K. Allen. Locally frequent in meadows, especially along Bussey Brook.

Corallorrhiza maculata Raf. CORAL ROOT ORCHIS. No. 28233. Rare in dry woods, near top of Peters Hill.

Salicaceae

**Salix alba* L. WHITE WILLOW. No. 36344. Low ground about pond, South Street tract.

Salix discolor Muhl. GLAUCOUS WILLOW. No. 36115. In low meadow near Administration Building. Possibly introduced or escaped here.

Salix petiolaris J. E. Sm. No. 36116. In low meadow near Administration Building and possibly introduced.

Salix cordata Muhl. HEART-LEAVED WILLOW. No. 36115. Springy ground southeast side of Peters Hill.

Salix Bebbiana Sarg. No. 36345. Moist rich ground, South Street tract.

Salix tristis Ait. DWARF GRAY WILLOW. No. 36115. Rocky open ground and borders of woods, Central Woods and near old stone quarry.

Populus grandidentata Michx. LARGE-TOOTHED ASPEN. J. G. Jack (1923). Persisting as sprouts on cleared slopes of Peters Hill.

Myricaceae

Myrica caroliniensis Mill. BAYBERRY. J. Robinson (1879). Rocky woods and thickets.

Comptonia asplenifolia (L.) Ait. SWEET FERN. No. 36350. Rocky open woods at several localities.

Juglandaceae

Juglans cinerea L. BUTTERNUT. No. 37733. Uncommon on wooded banks near Forest Hills gate, and as sprouts in woods near top of Peters Hill.

Carya ovata (Mill.) K. Koch. SHAG-BARK HICKORY. No. 37674. Infrequent in woods at several localities.

Carya alba (L.) K. Koch. MOCKER NUT. No. 37731. Uncommon in North Woods and south of Bussey Street.

Carya glabra (Mill.) Spach. PIGNUT. Nos. 37688. Found in deciduous woods, especially on conglomerate outcrops, at several places, but nowhere abundant.

Betulaceae

Ostrya virginiana (Mill.) K. Koch. HOP HORNBEAM. No. 37681. Not rare in deciduous woods throughout the Arboretum.

Corylus americana Walt. HAZELNUT. *E. L. Evinger*. Uncommon on rocky banks and in open woods.

Betula lenta L. SWEET BIRCH. No. 37690. Frequent in woods.

Betula populifolia Marsh. GRAY BIRCH. No. 37756. Borders of woods at several places, but not common.

Alnus rugosa (Du Roi) Spreng. SMOOTH ALDER. No. 36343. Uncommon along borders of brooks.

Alnus incana (L.) Moench. SPECKLED ALDER. *E. L. Evinger*. Along margins of brook. Uncommon.

Fagaceae

Fagus grandifolia Ehrh. BEECH. No. 37676. Frequent in woods at several localities.

Castanea dentata (Marsh.) Borkh. Chestnut. No. 37757. This handsome tree, formerly found in the deciduous woods, is now only represented in the native state by sprouts springing up from old stumps on Peters Hill.

Quercus alba L. WHITE OAK. No. 37687. One of the commonest trees of the deciduous woods, some fine large specimens being found in the North and Central Woods.

Quercus bicolor Willd. SWAMP WHITE OAK. No. 37682. Some large trees of this species are growing in low ground along the Valley Road, near the planted Oak groups.

Quercus coccinea Muench. SCARLET OAK. No. 36101. Uncommon in rocky woods. A few small trees were noted on Hemlock Hill and in the South Woods adjoining, and trees that are probably native occur elsewhere.

Quercus velutina Lam. BLACK OAK. No. 37678. Abundant in deciduous woods.

Quercus borealis Michx., var. *maxima* Ashe (*Q. rubra* Du Roi, not L.). RED OAK. No. 37677. One of the common trees of the deciduous woods, of which some fine specimens remain.

Quercus ilicifolia Wang. BEAR OAK. No. 36323. This shrubby species is still growing spontaneously on outcrops of conglomerate in the Central Woods.

Ulmaceae

Ulmus americana L. WHITE ELM. No. 37734. A few spontaneous specimens are still found. One large tree is growing in low ground at

the foot of the hills near the Meadow Road and the Aesculus group, and it was also noted on the wooded slope near the Forest Hill entrance.

Urticaceae

- **Cannabis sativa* L. HEMP. No. 36331. Found in rocky waste ground, about the old stone quarry.
- **Humulus japonicus* Sieb. & Zucc. JAPANESE HOP. No. 28104. Well established in rich open ground at the South Street tract.
- **Urtica dioica* L. STINGING NETTLE. No. 28059. Found as a weed in waste ground, but not abundant.
- Pilea pumila* (L.) Gray. CLEARWEED. No. 23655. Not rare in rich moist ground at several localities.
- Boehmeria cylindrica* (L.) Sw. FALSE NETTLE. Nos. 25914, 34993. Uncommon, as a weed in cultivated and open ground.

Santalaceae

- Comandra umbellata* (L.) Nutt. BASTARD TOAD-FLAX. No. 23571. Not rare on rock outcrops and in rocky open woods.

Aristolochiaceae

- **Aristolochia Clematidis* L. BIRTHWORT. In open ground and meadows, just east of Administration Building and elsewhere.

Polygonaceae

- **Rumex obtusifolius* L. BITTER DOCK. Nos. 23656, 37745. A common weed in waste ground and meadows.
- **Rumex crispus* L. YELLOW DOCK. Nos. 25743, 28109. Common as a weed in waste ground and open situations throughout the Arboretum.
- **Rumex acetosella* L. SHEEP SORREL. C. K. Allen. Common in dry open ground, especially on sterile gravelly slopes.
- Polygonum aviculare* L. KNOTWEED. Nos. 23673, 25894. A very common weed of meadows and waste ground and in all sorts of situations.
- Polygonum amphibium* L. WILLOW-WEED. No. 25963a. In shallow water and along muddy margins of pond, near Forest Hills entrance.
- Polygonum coccineum* Muhl. (*P. Muhlenbergii* (Meisn.) Wats.). SWAMP SMARTWEED. Nos. 25993, 36321. Common in moist meadows and about borders of ponds and brooks.
- Polygonum pennsylvanicum* L. SMARTWEED. No. 25926; Grigg & Palmer. Common in waste and cultivated ground, and sometimes also found in meadows and elsewhere.
- **Polygonum Persicaria* L. LADY'S THUMB. Nos. 23438a, 23564. A common weed in meadows and waste and cultivated ground.
- Polygonum Hydropiper* L. SMARTWEED. Nos. 23578, 23593. Common as a weed in wet meadows and about ponds and streams.

- Polygonum punctatum* Ell. WATER SMARTWEED. No. 25996; Grigg & Palmer. A common weed, especially in wet open ground.
- Polygonum hydropiperoides* Michx. WATER PEPPER. No. 28246. Moist meadows and borders of ponds.
- **Polygonum orientale* L. PRINCE'S FEATHER. Nos. 25917, 25948. In rich open ground, South Street tract.
- Polygonum arifolium* L. TEAR-THUMB. No. 23577. Moist meadows and margins of ponds. Uncommon.
- Polygonum sagittatum* L. TEAR-THUMB. No. 25925; C. K. Allen. Common in wet meadows and about ponds.
- **Polygonum convolvulus* L. BLACK BINDWEED. No. 23548. A weed in waste and cultivated ground, but not very common.
- Polygonum scandens* L. CLIMBING FALSE BUCKWHEAT. Nos. 23624a, 23672. A common weedy vine of waste and cultivated ground.
- **Polygonella articulata* (L.) Meisn. JOINTWEED. No. 25901. Rare and probably only a transient waif, collected in rich open ground, on South Street tract.
- **Fagopyrum esculentum* Moench. BUCKWHEAT. Nos. 25727, 37708. Not rare as a weed in cultivated and waste ground.

Chenopodiaceae

- **Chenopodium ambrosioides* L. MEXICAN TEA. No. 35144. A weed in meadows and waste ground, but nowhere very abundant.
- **Chenopodium album* L. LAMB'S QUARTER. No. 25873. A common weed of waste and cultivated ground.
- **Chenopodium album* var. *integrifolium* F. S. Gray. NARROW-LEAVED LAMB'S QUARTER. Nos. 25937, 35010. Growing as a weed in similar places to the typical form, and about as common.
- **Chenopodium album* var. *viridescens* St. Amans. GREEN LAMB'S QUARTER. Nos. 28251, 37736. Growing with the other varieties, and perhaps the commonest form.
- **Chenopodium murale* L. SOW-BANE. No. 36328. Uncommon as a weed in waste ground. Collected about old stone quarry.
- **Chenopodium urticum* L. GOOSEFOOT. No. 37714. A weed in waste ground, but not common.
- **Bassia hyssopifolia* (Pall.) Volk. No. 36351. This curious little plant, a native of the Caucasus region, was found growing about the old stone quarry, where it had been introduced in some unaccountable manner.

Amaranthaceae

- **Amaranthus retroflexus* L. PIGWEED. No. 23542. A weed in waste ground. Not very abundant.
- **Amaranthus graecizans* L. TUMBLEWEED. No. 36329. Collected near the old stone quarry. Uncommon.
- **Celosia argentea* L. COCK'S-COMB. Grigg & Palmer. Growing as a weed in rich open ground, South Street tract. Rare.

Phytolaccaceae

Phytolacca americana L. (*P. decandra* of authors, not L.) POKEWEED.
No. 23554; C. K. Allen. Frequent as a weed in waste and cultivated ground.

Aizoaceae

**Mollugo verticillata* L. CARPETWEED. No. 23547. Very common in cultivated beds and borders as well as in waste ground.

Caryophyllaceae

Spergularia rubra (L.) J. & C. Presl. SAND SPURRY. Nos. 23634, 23669a.
Common in waste and cultivated ground; and often growing in gravelly paths. This plant may be found in bloom almost throughout the year.
Arenaria lateriflora L. SANDWORT. No. 25614. Abundant in meadows and waste ground.

**Stellaria graminea* L. CHICKWEED. Nos. 23550, 25568. Abundant in waste and cultivated ground.

**Stellaria media* (L.) Cyrill. CHICKWEED. No. 23591. A very common weed in waste and cultivated ground. Blooms throughout the year.

**Cerastium arvense* L. FIELD MOUSE-EAR. F. W. Grigg. Cultivated and waste ground.

**Cerastium vulgatum* L. MOUSE-EAR. Nos. 25954, 37720. A very common weed of waste and cultivated ground.

**Lychnis alba* Mill. WHITE CAMPION. Nos. 25806, 36106. Not rare in waste ground and cultivated borders.

**Silene noctiflora* L. NIGHT-FLOWERING CATCHFLY. Nos. 28139, 37738. Not uncommon in waste ground and meadows.

**Silene latifolia* (Mill.) Britton & Rendle. BLADDER CAMPION. No. 23549; C. K. Allen. Frequent in meadows and waste ground.

**Dianthus Armeria* L. DEPTFORD PINK. Nos. 23450, 28054. Rather abundant in open woods and on dry banks.

Portulacaceae

**Portulaca oleracea* L. PURSLANE. No. 35061. Common in waste and cultivated ground.

Nymphaeaceae

**Nymphaea odorata* Ait. SWEET-SCENTED WATER LILY. No. 25648. In ponds near Forest Hills entrance.

Ranunculaceae

Ranunculus abortivus L. SMALL-FLOWERED CROWFOOT. No. 25619a. Rare in open woods and meadows.

Ranunculus allegheniensis Britton. No. 25619. Rare. Found growing with the last species, which it closely resembles except in the achenes. Probably introduced.

- **Ranunculus acris* L. TALL BUTTERCUP. No. 23532; C. K. Allen. Common in meadows.
- Ranunculus repens* L. TRAILING BUTTERCUP. Nos. 25578, 28079. Common in wet meadows and along banks of brooks.
- Thalictrum dioicum* L. EARLY MEADOW RUE. Nos. 25749a, 34995a. Locally abundant in woods.
- Thalictrum polygamum* Muhl. TALL MEADOW RUE. No. 23482; C. K. Allen. Common in low meadows and along brook.
- Aquilegia canadensis* L. COLUMBINE. No. 25723. Rather rare in clefts and on ledges of conglomerate, Hemlock Hill and South Woods.
- †*Hepatica americana* (DC.) Ker. (*H. triloba* Chaix.). This attractive little early spring plant is reported by Professor J. G. Jack to have been growing until a few years ago on hill slopes in the East Woods, but unfortunately it is now extinct here.

Berberidaceae

- **Berberis vulgaris* L. COMMON BARBERRY. No. 37705. Not uncommon as an undershrub in open rocky woods and on ledges.

Lauraceae

- Sassafras officinale* Nees & Eberm. SASSAFRAS. No. 37752. Found on borders of woods and in thickets at several places. Most abundant on Peters Hill.

Papaveraceae

- **Chelidonium majus* L. CELANDINE. C. K. Allen, P. H. Wardwell. Frequent on wooded banks and along walls.
- **Bocconia cordata* Willd. PLUME POPPY. No. 28170. Amongst shrubs on Overlook, where it may have originally been planted, but apparently well established.

Cruciferae

- **Lobularia maritima* (L.) Desv. SWEET ALYSSUM. Grigg & Palmer. Collected in rich waste ground about pond, on South Street tract.
- **Iberis umbellata* L. CANDYTUFT. No. 28106. Growing as a waif in rich ground, South Street tract.
- Lepidium virginicum* L. PEPPERGRASS. No. 23558. Uncommon in waste and cultivated ground.
- Lepidium apetalum* Willd. No. 25609. A common weed in waste and cultivated ground.
- **Lepidium campestre* (L.) R. Br. Nos. 27965, 28019. Locally abundant in waste ground, about old stone quarry and on South Street tract.
- **Thlaspi arvense* L. PENNY CRESS. No. 27966. In waste ground.
- **Capsella Bursa-pastoris* (L.) Medic. SHEPARD'S PURSE. No. 23661; C. K. Allen. A common weed in waste and cultivated ground and in meadows.

- **Raphanus Raphanastrum* L. RADISH. Nos. 23673a, 26354a. Common in cultivated and waste ground.
- **Brassica arvensis* (L.) Ktze. CHARLOCK. Nos. 25804, 27967. Frequent as a weed in waste ground.
- **Brassica Napus* L. RAPE. Nos. 28020, 28158. A weed in waste ground.
- **Sisymbrium altissimum* L. TUMBLE MUSTARD. Nos. 25903, 27968. Occasionally found as a weed in meadows and waste ground.
- **Sisymbrium officinale* (L.) Scop. var. *leiocarpum* DC. HEDGE MUSTARD. No. 23600; C. K. Allen. A weed in meadows and waste ground.
- **Erysimum cheiranthoides* L. WORM-SEED MUSTARD. Nos. 25763, 28002a. Local in cultivated and waste ground, South Street tract and near Dawson nursery.
- **Roripa Nasturtium-aquaticum* (L.) Britten & Rendle. WATER CRESS. Nos. 25649, 28003. Frequent along brooks and about ponds.
- Roripa palustris* (L.) Bess. MARSH CRESS. Nos. 25799, 25909. Abundant in wet meadows and along muddy banks of ponds.
- **Roripa Armoracia* (L.) Robinson. HORSE RADISH. No. 28111a. Occasional in meadows and open ground.
- Barbarea vulgaris* R. Br. YELLOW ROCKET. No. 28078. Frequent in wet ground along brooks, and in wet meadows.
- Barbarea vulgaris* var. *longisiliquosa* Carion. No. 23504. Wet ground and sometimes in dryer situations in waste places.
- Barbarea stricta* Andr. No. 27930. Wet meadows and waste ground.
- Arabis laevigata* (Muhl.) Poir. SMOOTH ROCK CRESS. No. 25613. Local and uncommon on rocky ledges, near old stone quarry.

Crassulaceae

- Penthorum sedoides* L. DITCH STONECROP. No. 28206a. Uncommon in wet ground about ponds and along brooks.
- **Sedum purpureum* Tausch. LIVE-FOR-EVER. No. 25719; C. K. Allen. Dry open ground and waste places at several localities.

Saxifragaceae

- Saxifraga pennsylvanica* L. SWAMP SAXIFRAGE. No. 27984. Very local in boggy ground about spring, on southeast slope of Peters Hill.

Hamamelidaceae

- Hamamelis virginiana* L. WITCH-HAZEL. Formerly native in woods, and a few plants that are probably spontaneous still remain. Specimens collected by C. E. Faxon, Jamaica Plain, Oct. 20, 1884, now in this herbarium, may have come from Arboretum.

Rosaceae

- Spiraea latifolia* Borkh. MEADOW-SWEET. No. 37709; C. K. Allen.

- Frequent in parts of meadow that are not too frequently mowed and in borders of woods.
- Spiraea tomentosa* L. HARD-HACK. No. 36104. Not uncommon in rocky open ground and in undisturbed meadows.
- Amelanchier oblongifolia* (T. & Gr.) Roem. JUNE BERRY. Occasional in woods.
- Amelanchier laevis* Wiegand. SERVICE BERRY. No. 37740. Uncommon in woods.
- Crataegus Arnoldiana* Sarg. ARNOLD THORN. No. 37739. The type tree from which this species was described was found spontaneous, on a bank near the Bussey greenhouse, and a small plant, though probably not the original tree, is still growing there.
- Sorbaronia fallax* Schneider (*Aronia melanocarpa* × *Sorbus Aucuparia*). A. Rehder (1902). This interesting hybrid between the Chokeberry and the European Roan Tree was discovered on the border of the Central woods and appears to have originated spontaneously here. *Aronia melanocarpa* is a native plant in the region and probably once occurred in the Arboretum, although we have no positive evidence of it. The other supposed parent is much planted and is a frequent escape, and it is probably the plant referred to on Professor Sargent's list as *Pyrus americana*.
- Fragaria virginiana* Duchesne var. *illinoensis* (Prince) Gray. WILD STRAWBERRY. No. 35046. Meadows and open woods.
- Fragaria vesca* L. var. *americana* Porter. Nos. 25583, 28249. Frequent in open woods and meadows.
- Potentilla monspeliensis* L. Rough Cinquefoil. No. 23483; C. K. Allen. Abundant in meadows and open ground.
- Potentilla monspeliensis* var. *norvegica* (L.) Rydb. Nos. 25753, 25904. Frequent in wet meadows and waste ground.
- Potentilla argentea* L. SILVERY CINQUEFOIL. Nos. 25792, 28053. Uncommon in dry rocky or gravelly ground.
- **Potentilla recta* L. TALL CINQUEFOIL. No. 28053. Uncommon in open or waste ground.
- Potentilla pumila* Poir. LOW CINQUEFOIL. Nos. 25580, 25624. Abundant in dry rocky woods and on conglomerate outcrops.
- Potentilla canadensis* L. CINQUEFOIL. Nos. 23510, 25581. Uncommon in meadows and open woods.
- **Filipendula Ulmaria* (L.) Maxim. QUEEN OF THE PRAIRIE. No. 35027a. Growing on the margin of a small pond, south side of road, near Forest Hills entrance.
- Geum canadense* Jacq. AVENS. Nos. 23446, 25745, 34991. Uncommon in dry woods. A form with yellow petals (no. 34991) was collected on a wooded bank, near the South Street gate.
- **Rubus Idaeus* L. RED RASPBERRY. Nos. 36118, 36121. Occasional in meadows and thickets. Probably introduced.

- Rubus occidentalis* L. BLACK RASPBERRY. No. 36120a. Borders of woods and thickets.
- **Rubus odoratus* L. PURPLE FLOWERING RASPBERRY. Rather abundant in thickets and undisturbed meadows.
- Rubus recurvans* Blanchard. DEWBERRY. No. 37689; *C. E. Faxon* (1909). Common on outcrops of conglomerate and in dry open woods.
- Rubus setosus* Bigel. BRISTLY BLACKBERRY. Nos. 36118, 36121; *J. Dawson* (1884); *C. E. Faxon* (1908). Frequent in low meadows.
- Rubus nigricans* Rydb. BLACKBERRY. No. 36120. Low meadow near Administration building. Perhaps introduced.
- Rubus argutus* Link. BLACKBERRY. No. 37747; *C. E. Faxon* (1909). Rocky banks and undisturbed meadows.
- Rubus hispidus* L. DEWBERRY. *C. E. Faxon* (1909). Locally abundant in wet meadows, especially along Bussey Brook, near Conifers.
- **Rubus crataegifolius* Bunge. No. 36102. This Asiatic species has become well established in the open woods near the South Street gate.
- Rosa carolina* L. (*R. humilis* Marsh.) WILD ROSE. Nos. 37718, 37683. Abundant in open ground and in undisturbed meadows.
- Rosa virginiana* Mill. WILD ROSE. Found in similar situations to the last species, but less common.
- Prunus serotina* Ehrh. WILD BLACK CHERRY. No. 37754. Frequent in woods.
- Prunus virginiana* L. CHOKE CHERRY. No. 37732. Abundant as an undershrub in deciduous woods and in thickets.

Leguminosae

- Cassia marilandica* L. WILD SENNA. No. 23890a. Rare in borders, and perhaps introduced.
- Baptisia tinctoria* (L.) R. Br. FALSE INDIGO. Nos. 23630, 25725. Frequent in open woods and on conglomerate outcrops.
- **Genista tinctoria* L. DYER'S GREENWOOD. *C. K. Allen*. Common in undisturbed meadows and borders of woods, especially near Central Woods.
- **Trifolium arvense* L. RABBIT-FOOT CLOVER. No. 23640. Frequent in rocky waste ground.
- **Trifolium incarnatum* L. CRIMSON CLOVER. No. 28186. In waste ground, South Street tract.
- **Trifolium pratense* L. RED CLOVER. No. 23658; *C. K. Allen*. Common in meadows.
- **Trifolium repens* L. WHITE CLOVER. Common in meadows and waste ground.
- **Trifolium hybridum* L. ALSIKE CLOVER. No. 25576; *C. K. Allen*. Frequent in meadows and waste ground.
- **Trifolium agrarium* L. HOP CLOVER. Nos. 25634, 27969. Frequent in rocky waste ground.

- **Medicago lupulina* L. BLACK MEDIC. No. 23574; C. K. Allen. Common in waste ground.
- **Melilotus officinalis* (L.) Lam. YELLOW SWEET CLOVER. No. 25878. Occasional in waste ground and meadows.
- **Melilotus alba* Desf. WHITE SWEET CLOVER. No. 27970. In waste ground, South Street tract, and about old stone quarry.
- **Dalea alopecuroides* Willd. BUSH CLOVER. Nos. 28152, 36335; Grigg & Palmer. Locally abundant in rich ground, South Street tract.
- Desmodium nudiflorum* (L.) DC. Nos. 28143, 35240. Rare in rocky open woods, on southeast side of Hemlock Hill. Plants of this genus are commonly known as BEGGARS TICKS or TICK TRIFOIL, but the different species are scarcely distinguished from each other.
- Desmodium rotundifolium* (Michx.) DC. No. 27963. Rocky open woods, on southeast side of Hemlock Hill. Local and uncommon.
- Desmodium canadense* (L.) DC. Nos. 25995, 28211. Locally abundant in open woods at several localities.
- Desmodium marilandicum* (L.) DC. Nos. 25946, 28141. Local in rocky open woods, south side of Hemlock Hill.
- Desmodium rigidum* (Ell.) DC. Nos. 25947, 28142. Locally abundant at one locality, rocky slope, south side of Hemlock Hill.
- Lespedeza intermedia* (Wats.) Britton. BUSH CLOVER. Nos. 25945, 35128. Locally abundant in rocky open woods on south side of Hemlock Hill.
- **Lespedeza striata* (Thunb.) H. & A. JAPANESE CLOVER. No. 28195. Rare and probably transient in rich soil, South Street tract.
- **Vicia angustifolia* (L.) Reichard. COMMON VETCH. No. 28159. Uncommon in rocky waste ground.
- **Vicia angustifolia* var. *segetalis* (Thuillier) Koch. Nos. 25738, 28062. Growing in similar places to the typical form, and apparently more common.
- **Vicia tetrasperma* (L.) Moench. SMALL VETCH. No. 25750. Uncommon in meadows and waste ground.
- **Vicia Cracca* L. COW VETCH. Nos. 25574, 28160. Common in meadows and waste ground. A native species but probably introduced here.
- Amphicarpa monoica* (L.) Ell. HOG PEANUT. No. 25951. Local in rocky ground, south side of Hemlock Hill.
- Amphicarpa Pücheri* T. & G. No. 28224. Local along spring rivulet, South side of Peters Hill.

Oxalidaceae

- **Oxalis europaea* Jordan (*O. stricta* of authors, in part, not L.). Wood Sorrel. Nos. 23490, 28011. Common in meadows and waste ground.
- **Oxalis europea* f. *cymosa* (Small) Wiegand (*O. cymosa* Small.). Nos. 28098, 35078. Frequent in meadows and waste and cultivated ground.

Geraniaceae

Geranium maculatum L. CRANESBILL. Nos. 27996, 28229. Uncommon in woods.

Euphorbiaceae

Acalypha virginica L. THREE-SEEDED MERCURY. Nos. 23521, 23602. Common in moist meadows and waste ground.

Euphorbia maculata L. MILK PURSLANE. Nos. 23546, 25978. Common as a weed in waste and cultivated ground.

**Euphorbia Cyparissias* L. CYPRESS SPURGE. No. 28052. Grassy open ground, about old cemetery, northwest side of Peters Hill.

Callitrichaceae

Callitriche heterophylla Pursh. WATER SPEARWORT. Nos. 23622, 28024. Frequent in shallow water of brooks and on margins of ponds.

Anacardiaceae

**Cotinus coggygia* Scop. EUROPEAN SMOKE-TREE. Observed growing on conglomerate ledges on the western slope of Hemlock Hill by Mr. Rehder, but not seen recently.

Rhus typhina L. STAG-HORN SUMACH. No. 36114. Doubtless originally native and now also adventive in several parts of the Arboretum.

Rhus glabra L. SMOOTH SUMACH. No. 37749. Borders of woods and thickets.

Rhus Toxicodendron L. POISON IVY. No. 37748. Abundant on rocky banks and along walls.

Celastraceae

Celastrus scandens L. BITTER-SWEET. No. 37753. Freely escaping and perhaps native in Peters Hill Woods.

Aceraceae

Acer saccharum Marsh. SUGAR MAPLE. Nos. 35675, 37730. Abundant in woods, especially on the low glacial hills of the North Woods.

Acer rubrum L. RED MAPLE. No. 37758. Not uncommon both in low ground and sometimes in rocky woods.

Balsaminaceae

Impatiens biflora Walt. JEWELWEED. No. 23492; C. K. Allen. Abundant in wet meadows and along borders of streams and ponds.

Rhamnaceae

Ceanothus americanus L. NEW JERSEY TEA. No. 37706. Rocky woods, south side of Hemlock Hill.

**Rhamnus cathartica* L. BUCKTHORN. No. 37759. Established in woods on Peters Hill and also in low meadow near Administration Building.

- **Rhamnus Frangula* L. No. 36111. In low meadow near Administration Building.

Vitaceae

- Vitis Lecontiana* House (*V. bicolor* Lam.). SUMMER GRAPE. No. 37704.
Rare and local in rocky woods, southwest slope of Hemlock Hill.
Parthenocissus quinquefolia var. *hirsuta* (Donn) Planch. VIRGINIA CREEPER. No. 36103. Occasional in rocky woods.

Tiliaceae

- Tilia glabra* Vent. (*T. americana* L. in part). BASSWOOD. No. 37729.
Rare, in East Woods, though probably formerly more abundant.

Malvaceae

- **Althaea rosea* Cav. HOLLYHOCK. In rich waste ground, South Street tract.
**Napaea dioica* L. GLADE MALLOW. No. 25893. Found in rocky open ground near Center Street gate.
Hibiscus Moscheutos L. SWAMP ROSE MALLOW. Nos. 37692, 37725.
About borders of ponds. Perhaps introduced.
**Malva rotundifolia* L. CHEESES. No. 25968. A weed in meadows and waste ground. Uncommon.
**Malva moschata* L. MUSK MALLOW. Nos. 37692, 37725. In open ground near Pinetum and near Bussey House.

Guttiferae

- **Hypericum Ascyron* L. GREAT ST. JOHN'S-WORT. No. 23486; C. K. Allen. Locally abundant in low meadow near Administration Building.
**Hypericum perforatum* L. COMMON ST. JOHN'S-WORT. No. 23432; C. K. Allen. Common in meadows and dry open ground throughout the Arboretum.
Hypericum boreale (Britton) Bicknell. C. K. Allen. Apparently rare, in moist ground about ponds. This and several of the following species are indiscriminately called St. John's-wort.
Hypericum mutilum L. No. 23487; Grigg & Palmer. Common in wet meadows and about ponds and brooks.
Hypericum majus (Gray) Britton. Nos. 25691a, 28173. Uncommon in wet meadows.
Hypericum canadense L. Nos. 25891, 35108. Common in wet meadows and in cultivated beds.
Hypericum gentianoides (L.) B.S.P. PINEWEEED. Nos. 23569, 32240. Locally abundant on outcrops of conglomerate and on sterile clay and gravel.

Cistaceae

- Helianthemum canadense* (L.) Michx. FROSTWEED. Nos. 25590, 35075.
Abundant in dry meadows and in dry gravelly ground.

Helianthemum Bicknellii Fernald. Frostweed. No. 25732. Abundant in dry rocky woods and open ground.

Lechea villosa Ell. PINWEED. No. 23561. Locally abundant on dry gravelly open slopes of Peters Hill.

Violaceae

Viola cucullata Ait. MARSH BLUE VIOLET. Nos. 25564, 25971. Frequent in wet meadows and open ground.

Viola papilionacea Pursh. BLUE VIOLET. Nos. 23488, 28113a. Common in meadows throughout the Arboretum.

Viola fimbriatula Sm. OVATE-LEAVED VIOLET. Nos. 25941, 35060. Frequent in meadows and cultivated beds from border of Central Woods to Peters Hill.

Viola lanceolata L. LANCE-LEAVED VIOLET. Nos. 25563, 28170. Locally common in wet meadows, near Administration Building and along Bussey Brook.

Viola pallens (Banks) Brainerd. NORTHERN WHITE VIOLET. Nos. 25620, 28084. Local in wet meadows, near Administration Building, along Bussey Brook and on slope of Peters Hill.

Viola lanceolata \times *pallens*. No. 28083a. An apparent hybrid between these two species was collected in the border of the low meadow, between the Meadow Road and the Arborway wall, where it was growing with both of the supposed parent species.

Lythraceae

**Decodon verticillatus* (L.) Ell. var. *laevigatus* T. & G. WATER WILLOW. No. 25936a. Borders of ponds near Forest Hills entrance. Probably originally planted.

**Lythrum salicaria* L. PURPLE LOOSESTRIFE. No. 25801; C. K. Allen. Common in low meadows and about ponds, and sometimes in dryer waste ground.

Onagraceae

Ludwigia palustris (L.) Ell. WATER PURSLANE. No. 25928a. In shallow water along Bussey Brook, and on muddy borders of ponds.

Epilobium angustifolium L. GREAT FIREWEED. No. 25898. In rich open ground, South Street tract.

Epilobium coloratum Muhl. WILLOW-HERB. Nos. 23537, 25897. Rich or moist ground, South Street tract, and along brooks.

Oenothera biennis L. COMMON EVENING PRIMROSE. Nos. 23491, 25940. Common in meadows, open woods and waste ground throughout the Arboretum.

Oenothera perennis L. SUNDROPS. No. 28193; C. K. Allen. Locally abundant in wet meadows and about borders of ponds.

Oenothera fruticosa L. var. *hirsuta* Nutt. Dry open ground, in Oak groups. Perhaps introduced.

Circaea latifolia Hill (*C. lutetiana* L.). ENCHANTER'S NIGHTSHADE. Nos. 23653, 25748. Local on wooded banks near Forest Hills gate and in South Woods.

**Trapa natans* L. WATER NUT. No. 25831. Uncommon and local in shallow water and along muddy margins of pond south of road, near Forest Hills entrance.

Araliaceae

Aralia racemosa L. SPIKENARD. No. 25789. Local along shaded rocky slopes and ledges, south side of Hemlock Hill.

Aralia nudicaulis L. WILD SARSAPARILLA. Nos. 23572, 25593. Frequent in rocky woods, especially on Hemlock Hill and in South Woods.

Umbeliferae

Hydrocotyle americana L. WATER PENNYWORT. Local in boggy ground about spring, southeast side of Peters Hill and also in wet spots at foot of hills, by North Woods.

Cicuta maculata L. SPOTTED COWBANE. No. 23489; *C. K. Allen*. Frequent in low meadows, along streams and about borders of ponds.

Cicuta bulbifera L. WATER HEMLOCK. No. 36336; *Grigg & Palmer*. Not rare on muddy borders of ponds and brooks.

Sium suave Walt. WATER PARSNIP. Nos. 23560, 25871. Rather uncommon on borders of ponds and along brooks.

Zizia aurea (L.) Koch. GOLDEN ALEXANDERS. No. 25989. Rare, in dry open woods near top of Peters Hill.

**Aethusa Cynapium* L. FOOL'S PARSLEY. No. 36333a. Uncommon, as a weed in beds and waste ground, foot of hills, near North Woods.

**Pastanaca sativa* L. PARSNIP. No. 28026. Uncommon in meadows and waste ground.

**Daucus Carota* L. CARROT, QUEEN ANNE'S LACE. No. 23444; *C. K. Allen*. Common in meadows and waste ground.

Cornaceae

Cornus florida L. FLOWERING DOGWOOD. No. 37702. Occasional in woods, especially on Hemlock Hill and Peters Hill.

Cornus racemosa Lam. (*C. paniculata* L'Her.). SMALL-FLOWERED DOGWOOD. No. 37680. Not rare in woods and thickets at several localities.

Cornus amomum Mill. KINNIKINNIK. Uncommon in wet meadows and along brook.

Pyrolaceae

Chimaphila umbellata (L.) Nutt. var. *cisatlantica* Blake. PRINCE'S PINE. No. 25756; *E. L. Evinger*. Uncommon in woods, Central Woods and near Center Street gate.

Pyrola elliptica Nutt. WINTERGREEN. Nos. 25714, 28041. Local on grassy slopes and borders of woods, Central Woods and near Peters Hill.

Monotropaceae

Monotropa uniflora L. INDIAN PIPE. No. 25883; *C. K. Allen*. Frequent in Oak woods, depressions in glacial hills, also under Hemlocks, south side of Hemlock Hill.

Monotropa Hypopitys L. PINE SAP. No. 35327. Rare and local, under Oak trees, west slope, below Overlook.

Ericaceae

Kalmia angustifolia L. SHEEP'S LAUREL. No. 36354. Rare and local, on gravelly north slopes of Peters Hill, persisting in Hawthorn plantation, and along Bussey Brook.

Gaultheria procumbens L. CHECKERBERRY. No. 36358. Locally abundant on wooded north slopes of Hemlock Hill.

Arctostaphylos uva-ursi (L.) Spreng. BEARBERRY. Rocky banks on south side of Hemlock Hill. Perhaps introduced.

Gaylussacia baccata (Wang.) K. Koch. BLACK HUCKLEBERRY. No. 37686. Not uncommon in dry rocky woods, Central Woods and Hemlock Hill.

**Calluna vulgaris* (L.) Salisb. HEATHER. *C. K. Allen*. Established in gravelly ground of meadow in Linden group.

Vaccinium pennsylvanicum Lam. EARLY SWEET BLUEBERRY. No. 37685, 37719. Common in open rocky woods, especially on conglomerate outcrops.

Vaccinium vacillans Lam. LATE LOW BLUEBERRY. No. 37684. Common with the last species.

Primulaceae

Hottonia inflata L. FEATHERFOIL. No. 25683. Local in shallow water of pond, near Forest Hills gate. Not seen lately and perhaps now extinct in the Arboretum.

Lysimachia terrestris (L.) B.S.P. LOOSESTRIFE. No. 36109; *C. K. Allen*. Common in open woods, especially on gravelly glacial hills, south of Administration Building.

Lysimachia quadrifolia L. WHORLED LOOSESTRIFE. No. 23584; *C. K. Allen*. In similar situations and same localities as last, but less common.

Lysimachia Nummularia L. MONEYWORT. Nos. 25603, 25713. Moist shaded ground at foot of Hemlock Hill, on southeast side.

Steironema lanceolatum (Walt.) Gray. LOOSESTRIFE. No. 28172. Uncommon in wet meadows.

Oleaceae

Fraxinus americana L. WHITE ASH. No. 37679. Frequent in woods throughout the Arboretum.

**Ligustrum vulgare* L. PRIVET. No. 37760. In open woods near top of Hemlock Hill and at a few other localities.

Gentianaceae

†*Gentiana crinita* Froel. FRINGED GENTIAN. Although this pretty plant is now unfortunately extinct in the Arboretum, it was until a few years ago growing in the low meadow, near the Administration Building, where it was known by Mr. Rehder and Professor Jack. A specimen in the Gray Herbarium, collected by Mr. C. E. Faxon, in 1884, and labeled West Roxbury, may have come from the Arboretum, since other Arboretum plants collected by him at that time were so labeled.

Apocynaceae

Apocynum androsaemifolium L. PINK-FLOWERED DOGBANE. Nos. 25761, 34998. Locally abundant in rocky open slopes of South Woods, and also on border of woods, near Dawson nursery.

Asclepidaceae

Asclepias purpurascens L. Purple-flowered Milkweed. No. 25760. Rare, in woods near top of Peters Hill.

Asclepias incarnata L. var. *pulchra* (Ehrh.) Pers. WOOLY MILKWEED. No. 23447; *C. K. Allen*. Abundant in low meadows and about borders of ponds and streams.

Asclepias syriaca L. COMMON MILKWEED. No. 25731; *C. K. Allen*. Common in meadows and thickets.

Asclepias phytolaccoides Pursh. POKE MILKWEED. No. 25879. Uncommon in open woods and amongst shrubs, near Bussey Hill.

Asclepias quadrifolia Jacq. FOUR-LEAVED MILKWEED. No. 25577. Local and uncommon, on rocky wooded slopes of Hemlock Hill.

**Cynanchum nigrum* (L.) Pers. BLACK SWALLOW-WORT. No. 28058. Locally abundant in meadows, near Dawson nursery and at other localities.

Convolvulaceae

**Convolvulus sepium* L. HEDGE BINDWEED. Nos. 25733, 36110. Frequent in low meadows, borders and waste ground.

**Convolvulus arvensis* L. SMALL BINDWEED. No. 28056. Uncommon in meadows and waste ground.

**Cuscuta Coryli* Engelm. DODDER. No. 35129. On *Hieracium paniculatum* and other herbs, rocky ground on south side of Hemlock Hill.

Cuscuta Gronovii Willd. No. 25879a. Frequent on various herbs. Meadows and borders of ponds and brooks.

Boraginaceae

**Myosotis scorpioides* L. FORGET-ME-NOT. Locally abundant along wet margins of Bussey Brook.

Verbenaceae

Verbena urticaefolia L. WHITE VERVAIN. Nos. 23662, 25006. Infrequent in meadows and waste ground.

Verbena hastata L. BLUE VERVAIN. No. 23505; C. K. Allen. Frequent in meadows and open ground.

Labiatae

**Ajuga reptans* L. BUGLE WEED. No. 28088. Uncommon in meadows and on open banks.

Trichostema dichotomum L. BLUE CURLS. Nos. 25965, 35071. Locally abundant in sterile soil, gravel, and rock outcrops, and spreading into cultivated beds.

Scutellaria lateriflora L. MAD-DOG SKULLCAP. Nos. 28206, 36322a. Not rare on moist shaded banks and in wet ground.

Scutellaria epilobifolia Hamilton. SKULLCAP. Nos. 25829, 25896. Locally abundant in rich open ground, South Street tract, and also amongst Rose border and other shrubs along Meadow Road, near Shrub Collection.

**Scutellaria altissima* L. Tall Skullcap. No. 25785; A. Rehder (1913). Local in rocky ground at the foot of Hemlock Hill, on the southeast side. The specimen collected by Mr. Rehder is in the Gray Herbarium.

**Nepeta hederacea* (L.) Trevisan. GROUND IVY. Nos. 25735, 27010. Common in meadows and waste ground at several places.

Prunella vulgaris L. SELF-HEAL. C. K. Allen. Common in meadows and waste ground, especially in moist places.

**Galeopsis Tetrahit* L. var. *bifida* (Boenn.) Lej. & Court. HEMP NETTLE. Nos. 23507, 25796. Abundant in low meadows and waste ground.

**Lamium amplexicaule* L. HENBIT. Nos. 32238, 35160. Frequent in meadows and waste ground. Has been found in flower as late as December first.

**Leonurus Cardiaca* L. MOTHERWORT. No. 37707. Uncommon, in waste ground. Collected at old stone quarry, near Bussey Street.

Stachys palustris L. WOUNDWORT. Nos. 25955, 37672. Infrequent in low meadows and waste ground.

Hedeoma pulegioides (L.) Pers. PENNYROYAL. Nos. 25830, 35132. Abundant in dry open ground, especially on or near rock outcrops.

Pycnanthemum flexuosum (Walt.) B.S.P. MOUNTAIN MINT. No. 25988. Uncommon and local in woods near top of Peters Hill.

Lycopus americanus Muhl. WATER HOARHOUND. No. 23506; C. K. Allen. Frequent in moist meadows and about ponds and brooks.

Lycopus uniflorus Michx. BUGLE WEED. Nos. 28228, 28245. Locally abundant in low meadows and about ponds.

Mentha arvensis L. FIELD MINT. No. 28034. Uncommon in moist open ground.

Mentha arvensis var. *canadensis* (L.) Briquet. WILD MINT. Nos. 25895, 35153. Common in low wet ground, meadows and borders of ponds and brooks.

**Perilla frutescens* (L.) Britton. BEEF-STEAK PLANT. No. 25943. Uncommon in waste ground, about old stone quarry.

Solanaceae

- **Solanum Dulcamara* L. CLIMBING NIGHTSHADE. No. 36359. Along brooks and in borders at several localities.
- **Solanum nigrum* L. COMMON NIGHTSHADE. No. 23672a. Common in cultivated and waste ground.
- **Solanum nigrum* var. *villosum* L. No. 37713. Rocky waste ground. Uncommon.
- **Physalis heterophylla* Nees. GROUND CHERRY. No. 28149. Rare in rich open ground, South Street tract.
- **Physalis heterophylla* var. *ambigua* (Gray) Rydb. Nos. 25970, 27971. Uncommon in border along Valley Road, near Chestnuts, and in rocky waste ground about old quarry.
- **Physalis subglabrata* Mack. & Bush. TALL GROUND CHERRY. No. 37737. Local on bank near Bussey greenhouse.
- **Petunia violacea* Lindl. PETUNIA. No. 28017. Growing as a waif in rich waste ground, South Street tract.
- **Nicotiana alata* L. var. *grandiflora* Comes. No. 37715. Growing as a waif in waste ground, South Street tract.

Scrophulariaceae

- **Verbascum Thapsus* L. MULLEIN. Nos. 25719, 25754. Frequent in open and waste ground.
- **Verbascum Blattaria* L. MOTH MULLEIN. Rare in borders near Overlook.
- **Linaria vulgaris* Hill. BUTTER AND EGGS. No. 25788; C. K. Allen. Common in meadows and waste ground.
- Linaria canadensis* (L.) Dumont. No. 35002; C. K. Allen. Frequent in cultivated ground and in dry open situations.
- **Pentstemon laevigatus* Ait. SMOOTH BEARD TONGUE. Nos. 25742, 35400. Rare and local in shaded border along Hemlock Hill Road, near Bussey Street crossing.
- Chelone glabra* L. TURTLEHEAD. No. 28250; C. K. Allen. Locally abundant along borders of brook and ponds.
- Ilysanthes dubia* (L.) Bernh. FALSE PIMPERNEL. Nos. 25790, 28102. Uncommon in rich moist ground and along muddy borders of ponds.
- **Veronica longifolia* L. VERONICA. Nos. 25747, 25864. Not rare locally in borders and on banks near Forest Hills entrance.
- Veronica scutellata* L. MARSH SPEEDWELL. Nos. 25644, 25838. Local on muddy banks of pond, near Shrub Collection.
- Veronica officinalis* L. COMMON SPEEDWELL. No. 37744; C. K. Allen. Common in meadows in many places.
- Veronica serpyllifolia* L. THYME-LEAVED SPEEDWELL. Nos. 35065, 35158. Uncommon in cultivated ground near South Street entrance.
- Aureolaria pedicularia* (L.) Raf. (*Gerardia pedicularia* L.) FALSE FOXGLOVE. Nos. 25920, 28216. Locally abundant in open rocky woods, south side of Hemlock Hill.

Aureolaria flava (L.) Pennell (*Gerardia flava* L.). SMOOTH FALSE FOX-GLOVE. No. 25877. Local and uncommon on rocky open slopes, south side of Hemlock Hill.

Agalinis tenuifolia (Vahl.) Raf. (*Gerardia tenuifolia* Vahl). SLENDER GERARDIA. Nos. 28210, 35068. Locally abundant in wet meadows, near Administration Building and along Bussey Brook. A white-flowered form has been found here.

Agalinis paupercula (Gray) Pennell (*Gerardia paupercula* Britt.). SMALL-FLOWERED GERARDIA. Nos. 25934, 25967. Locally abundant in similar locations to last species.

Melampyrum lineare Lam. COW WHEAT. No. 23527. Locally abundant in dry woods, especially on conglomerate outcrops.

Pedicularis canadensis L. LOUSEWORT. No. 28144. Rare and local on wooded bank, north side of Hemlock Hill.

Orobanchaceae

Orobanche uniflora L. BROOM-RAPE. Uncommon in open woods and meadows, near Conifer groups.

Plantaginaceae

Plantago Rugelii Dcne. PLANTAIN. No. 23589. A common weed in meadows and waste ground.

**Plantago lanceolata* L. ENGLISH RIB GRASS. No. 28108; C. K. Allen. Very common in meadows.

**Plantago aristata* Michx. RIB GRASS. Nos. 23597, 25791, 25791a. Locally abundant on a gravelly bank between Shrub Collection and Arborway wall, and also as a weed in cultivated beds.

Rubiaceae

Galium circaezans Michx. WILD LICORICE. Nos. 25566, 25875. Rocky woods, Peters Hill, Hemlock Hill and South Woods.

Galium tinctorium L. MARSH BEDSTRAW. Nos. 25653a, 27989. Wet meadows and boggy ground about springs.

Galium Claytoni Michx. BEDSTRAW. No. 28150; C. K. Allen. Frequent in moist meadows and about ponds.

Houstonia longifolia Gaertn. No. 27955. Rare and local in gravelly soil, North Woods.

Mitchella repens L. PARTRIDGE BERRY. No. 36360. Banks and open slopes, Hemlock Hill, where it may have been introduced.

Cephalanthus occidentalis L. BUTTONBUSH. Apparently spontaneous about small pond on northeast side of Bussey Hill.

Caprifoliaceae.

Triosteum aurantiacum Bicknell. HORSE GENTIAN. Nos. 25582, 28097. Local in rocky woods, South Woods, near Malus collection.

- **Lonicera tatarica* L. TARTARIAN HONEYSUCKLE. Occasional in thickets and borders of woods.
- **Lonicera japonica* Thunb. JAPANESE HONEYSUCKLE. Escaped in borders and thickets.
- Viburnum dentatum* L. ARROW-WOOD. Probably native along base of hills, North Woods.
- Viburnum acerifolium* L. ARROW-WOOD. No. 37703. Locally abundant in rocky woods, especially on Hemlock Hill.
- Viburnum Lentago* L. NANNYBERRY. Probably native in North Woods and on Hemlock Hill.
- Sambucus canadensis* L. ELDERBERRY. No. 37710; *C. K. Allen*. Frequent along brooks and in meadows.
- **Sambucus canadensis* var. *laciniata* Cowell. Adventive on bank between North Meadow and Arborway wall.

Cucurbitaceae

- **Echinocystis lobata* (Michx.) T. & G. WILD BALSAM-APPLE. Nos. 25938, 35091. Not uncommon in waste ground at several places.
- **Sicyos angulata* L. ONE-SEEDED BUR CUCUMBER. No. 23517. Uncommon in waste ground, South Street tract.

Campanulaceae

- Specularia perfoliata* (L.) A. DC. VENUS'S LOOKING-GLASS. No. 25758. Uncommon in waste and cultivated ground. Perhaps introduced.
- **Campanula rapunculoides* L. EUROPEAN BELLFLOWER. No. 25752. Frequent in meadows.
- **Campanula persicifolia* L. No. 37724. In meadows near Bussey Institute.
- **Lobelia cardinalis* L. CARDINAL-FLOWER. *P. H. Wardwell*. Local on margin of pond. Probably planted.
- **Lobelia siphilitica* L. BLUE LOBELIA. No. 23670. Rare and local along margins of brook, in Magnolia group, near Administration Building. Not seen recently and perhaps now gone from Arboretum.
- Lobelia inflata* L. INDIAN TOBACCO. Nos. 23582, 32237. Frequent in meadows and cultivated grounds.

Compositae

- **Vernonia noveboracensis* Willd. TALL IRONWEED. No. 23462. In border along Meadow Road, near North Woods and Aesculus groups. Probably originally planted.
- Eupatorium verticillatum* Lam. (*E. purpureum* L., in part). JOE-PYE WEED. No. 23495; *C. K. Allen*. Locally abundant along margins of brooks and about ponds.
- Eupatorium sessilifolium* L. UPLAND BONESET. Nos. 25944, 28146. Local on rocky ledges, south side of Hemlock Hill.

- Eupatorium perfoliatum* L. THOROUGHWORT. No. 23627. Frequent in wet meadows and along brooks.
- Eupatorium aromaticum* L. WHITE SNAKE-ROOT. Nos. 28145, 35117. Local on rocky slopes and ledges, south side of Hemlock Hill.
- **Eupatorium urticaefolium* Reichard. WHITE SNAKE-ROOT. No. 34332. Rare, in cultivated ground and meadow, near North Woods.
- **Mikania scandens* (L.) Willd. CLIMBING HEMPWEED. No. 35103. Rare along Bussey Brook, near Hemlock Hill.
- Solidago caesia* L. BLUE-STEMMED GOLDEN-ROD. No. 23667; C. K. Allen. Abundant on rocky shaded banks and in open woods.
- Solidago caesia* var. *paniculata* Gray. Grigg & Palmer. Open ground, South Street tract. Not common.
- Solidago puberula* Nutt. GOLDEN-ROD. Nos. 35149, 35157. Infrequent in open rocky ground, Central Woods.
- Solidago arguta* Ait. GOLDEN-ROD. No. 35115. Uncommon in rocky open woods, south side of Hemlock Hill.
- Solidago juncea* Ait. GOLDEN-ROD. Nos. 23437, 35116. Abundant in open woods and on gravelly slopes.
- Solidago rugosa* Mill. ROUGH-LEAVED GOLDEN-ROD. Nos. 23628, 35130. Common in low meadows and in moist ground about ponds and brooks.
- Solidago nemoralis* Ait. GRAY GOLDEN-ROD. No. 23438; C. K. Allen. Abundant in rocky open woods and on dry gravelly slopes.
- Solidago canadensis* L. CANADIAN GOLDEN-ROD. Nos. 23439, 35138. Common in meadows and along brooks.
- Solidago bicolor* L. WHITE GOLDEN-ROD. No. 23609; C. K. Allen. Frequent in dry open woods and in rocky or gravelly ground.
- Solidago graminifolia* (L.) Salisb. BUSHY GOLDEN-ROD. Nos. 23442, 23576. Abundant in dry meadows and in rocky or gravelly ground.
- Solidago caesia* \times *canadensis*. Grigg & Palmer. A plant that appears to be a hybrid between these two species was found in the low ground, near the border of the woods, on the South Street tract.
- Aster divaricatus* L. WHITE WOOD ASTER. Nos. 23243, 35139. Frequent in rocky woods.
- Aster macrophyllus* L. LARGE-LEAVED ASTER. Nos. 23568, 36105. Locally common in open woods at several localities.
- Aster novae-angliae* L. NEW ENGLAND ASTER. No. 23646. Common in low ground and in undisturbed meadows.
- Aster patens* Ait. LATE PURPLE ASTER. Nos. 23663, 35127. Rather infrequent in open woods and in rocky open ground.
- Aster undulatus* L. Nos. 35106, 35165. Uncommon in dry woods and on rocky slopes of Hemlock Hill.
- Aster cordifolius* L. BLUE WOOD ASTER. Nos. 23647, 35146a. Abundant in woods.
- Aster laevis* L. SMOOTH ASTER. Grigg & Palmer. Uncommon in meadows and moist ground.

- Aster dumosus* L. var. *cordifolius* (Michx.) T. & G. BUSHY ASTER. No. 35066. Uncommon in meadows and open ground.
- Aster vimineus* Lam. SMALL WHITE ASTER. Nos. 23614, 35146. Common in meadows and along brooks.
- Aster lateriflorus* (L.) Britton. CALICO ASTER. No. 28236; *Grigg & Palmer*. Abundant in low meadows and along streams.
- Aster lateriflorus* var. *pendulus* (Ait.) Burgess. Abundant in meadows and borders of streams.
- Aster paniculatus* Lam. TALL WHITE ASTER. *Grigg & Palmer*. Locally abundant in low meadows and about ponds and streams.
- Aster novi-belgii* L. NEW YORK ASTER. No. 35147; *Grigg & Palmer*. Abundant in wet meadows and about brooks and ponds.
- Aster puniceus* L. PURPLE-STEMMED ASTER. Nos. 23663a, 28242. Not common, in low meadows and along brooks.
- Aster umbellatus* Mill. FLAT-TOPPED WHITE ASTER. Nos. 26001, 28232. Locally abundant in open woods, especially on glacial hills in North Woods.
- Aster linearifolius* L. LOW VIOLET ASTER. No. 23433. Common on open gravelly slopes and on conglomerate outcrops. Very abundant and conspicuous in late autumn on Peters Hill.
- Aster dumosus* \times *vimineus*. No. 35151. A hybrid apparently between these two species collected in wet ground, near Peters Hill.
- Aster lateriflorus* \times *undulatus*. No. 35079. Found on border of woods near top of Peters Hill.
- Erigeron annuus* (L.) Pers. DAISY FLEABANE. No. 35151; *C. K. Allen*. Common in waste and cultivated ground.
- Erigeron ramosus* (Walt.) B. S. P. DAISY FLEABANE. No. 23434; *C. K. Allen*. Common in meadows and borders of woods.
- Erigeron canadensis* L. HORSE-WEED. No. 23613. A common weed in meadows and waste ground.
- Seriocarpus asteroides* (L.) B. S. P. WHITE-TOPPED ASTER. Nos. 23445, 28148. Frequent in dry open woods and in rocky or gravelly open ground.
- Antennaria neodioica* Greene. SMALL-LEAVED CAT'S-FOOT. No. 25657. Locally abundant on gravelly banks between Shrub Collection and Arborway wall.
- Antennaria fallax* Greene. INDIAN TOBACCO. No. 25626. Frequent in dry rocky woods and on gravelly slopes.
- Anaphalis margaritacea* (L.) B. & H. PEARLY EVERLASTING. Nos. 23443, 25872. Frequent in dry meadows and on gravelly slopes.
- Gnaphalium obtusifolium* L. COMMON EVERLASTING. No. 23567. Frequent in meadows and waste ground.
- Gnaphalium uliginosum* L. LOW CUDWEED. Nos. 23583, 32241. Abundant in waste and cultivated ground.
- **Silphium integrifolium* Michx. ROSIN-WEED. No. 23624. In border near Birch groups. Probably originally planted.

- **Silphium perfoliatum* L. CUP-PLANT. Nos. 23623, 35009. A large clump of this is growing in the low meadow south of the Administration Building, and in border near Birches.
- Ambrosia artemisiifolia* L. RAGWEED. Nos. 23485, 32239. Common in meadows, waste and cultivated ground.
- Rudbeckia hirta* L. BLACK-EYED SUSAN. Nos. 25572, 25728; *P. H. Wardwell*. Frequent in meadows and in borders.
- **Helianthus annuus* L. COMMON SUNFLOWER. No. 25949. In rich open ground, South Street tract.
- Helianthus divaricatus* L. WOOD SUNFLOWER. Nos. 28140, 34997. On rocky slopes and ledges, south side of Hemlock Hill and in border of North Woods, near Dawson nursery.
- **Helianthus decapetalus* L. WILD SUNFLOWER. No. 25911. Occasional in waste ground and borders.
- **Helianthus tuberosus* L. JERUSALEM ARTICHOKE. No. 25994. A large bed of this species is growing in the low meadow south of Administration Building.
- **Coreopsis major* Walt. WOOD TICKSEED. No. 25885. In borders near Center Street gate.
- **Coreopsis grandiflora* Hogg var. *subintegra* T. & G. No. 37726. Open ground near Bussey house, and probably escaped from cultivation in garden of Bussey Institute.¹
- Bidens connata* Muhl. PURPLE-STEMMED BEGGAR-TICKS. Nos. 35111, 35089. Not common in wet ground about ponds.
- Bidens frondosa* L. BEGGAR-TICKS. Nos. 23643, 3665a. Abundant in wet meadows and about borders of ponds and brooks.
- Bidens cernua* L. NODDING BUR MARIGOLD. Nos. 35088, 35090, 35134. Abundant along brooks and on borders of ponds.
- Bidens vulgata* Greene. STICK-TIGHT. No. 26003; *Grigg & Palmer*. Abundant in moist open ground about ponds and brooks.
- **Madia sativa* Molina var. *congesta* T. & G. CHILE TARWEED. Rare in cultivated beds along meadow Road in Linden and Horse-chestnut groups. Collected in 1924 and not seen since. Perhaps now gone from the Arboretum.
- **Galinsoga parviflora* Cav. var. *hispida* DC. No. 28012. Common as a weed in waste and cultivated ground.
- Achillea Millefolium* L. YARROW. No. 23651; *C. K. Allen*. Common in meadows and waste ground.
- **Achillea Ptarmica* L. SNEEZEWEED. No. 27728. Growing as an escape

¹The typical form of this species, as it grows on the prairies of the southern and southwestern states, has leaves with narrow linear, fleshy segments, and it was thus described in Hogg's mss., and illustrated in Sweet's British Flower Garden, II. t. 175. The plant collected in the Arboretum, which seems to be the common form in cultivation, has membranaceous leaves, with much wider lanceolate or linear-lanceolate segments, up to 1 cm. wide, the lower entire and the upper with small lateral segments. It appears to be a well marked variety, and I am somewhat doubtfully referring it to the form γ *subintegrifolia*, of Torrey & Gray's Flora of North America, II. 345.

in meadows near the Bussey Institute. This is the cultivated variety known under the garden name of "The Pearl."

- **Anthemis Cotula* L. DOG-FENNEL. Nos. 23595, 35145. Frequent in borders and waste ground.
- **Anthemis arvensis* L. CORN CAMOMILE. No. 27972. Uncommon in waste or open rocky ground.
- **Chrysanthemum Leucanthemum* L. OX-EYE DAISY. No. 23657. In meadows and waste ground with the next variety, which is more abundant.
- **Chrysanthemum Leucanthemum* var. *pinnatifidum* Lecoq & Lamotte. C. K. Allen.
- **Tanacetum vulgare* L. TANSY. C. K. Allen. A very common weed in undisturbed meadows and waste ground.
- **Artemisia vulgaris* L. COMMON MUGWORT. Nos. 28061, 28115. Uncommon in waste ground.
- Erechtites hieracifolia* (L.) Raf. FIREWEED. No. 35011, 35162. Frequent as a weed in waste and cultivated ground.
- Erechtites hieracifolia* var. *intermedia* Fernald. No. 23575. Grows in similar places to the typical form, but less abundant.
- **Senecio vulgaris* L. COMMON GROUNDSEL. Nos. 23667a, 35104. Abundant in cultivated beds and waste ground.
- **Arctium minus* Benth. COMMON BURDOCK. Nos. 23555, 35094. Frequent as a weed in waste and open ground.
- **Cirsium lanceolatum* (L.) Hill. BULL THISTLE. Nos. 25912, 28101. Frequent in waste ground and undisturbed meadows.
- **Cirsium arvense* (L.) Scop. CANADA THISTLE. Locally abundant in undisturbed meadows and in waste ground at South Street tract.
- **Centaurea Cyanus* L. CORN-FLOWER. Nos. 27973, 28105. Uncommon in meadows and waste ground.
- **Centaurea nigra* L. KNAPWEED. No. 23668a; C. K. Allen. Locally abundant in meadow near Conifers.
- **Lapsana communis* L. NIPPLE-WORT. No. 25910. Rich open ground about pond, South Street tract.
- **Cichorium Intybus* L. CHICORY. C. K. Allen. Common in meadows and open ground.
- **Leontodon autumnalis* L. FALL DANDELION. No. 23625; C. K. Allen. Very common in meadows.
- **Taraxacum officinale* Weber. DANDELION. Common in meadows. Blooming almost throughout the year.
- **Taraxacum erythrospermum* Andr. Nos. 23659, 28040. In meadows with the last species, and perhaps even more common. Blooms from early Spring until well into the winter.
- **Sonchus oleraceus* L. SOW THISTLE. Nos. 25710, 25927. Frequent as a weed in waste and cultivated ground.
- **Lactuca scariola* L. var. *integrata* Gren. & Godr. PRICKLY WILD LETTUCE.

- No. 23666; *C. K. Allen*. Common in waste ground and undisturbed meadows.
- Lactuca canadensis* L. WILD LETTUCE. Nos. 23626, 28095. Common in meadows and waste ground.
- Lactuca spicata* (Lam.) Hitchc. TALL WILD LETTUCE. No. 23649; *Grigg & Palmer*. Frequent in low meadows and borders.
- Prenanthes alba* L. RATTLESNAKE-ROOT. No. 23648; *C. K. Allen*. Abundant in open woods, especially on low glacial hills along Meadow Road.
- **Hieracium aurantiacum* L. DEVIL'S PAINT-BRUSH. *C. K. Allen*. Infrequent in meadows and along paths.
- **Hieracium pilosella* L. MOUSE-EAR. No. 25823; *C. K. Allen*. Local along grassy path in Shrub Collection.
- **Hieracium pratense* Tausch. KING DEVIL. *F. W. Grigg*. Meadows.
- Hieracium venosum* L. POOR ROBIN'S PLANTAIN. Nos. 27958, 28183. Locally abundant in rocky woods, south side of Hemlock Hill and in woods along South Street.
- Hieracium paniculatum* L. TALL HAWK-WEED. Nos. 25959, 28217. Local on rocky slopes, south side of Hemlock Hill.
- Hieracium scabrum* Michx. ROUGH HAWK-WEED. Nos. 23669, 28218. Not rare locally in rocky woods.

A SECOND SUPPLEMENT TO THE FLORA OF BARRO COLORADO ISLAND, PANAMA

PAUL C. STANDLEY

It is a great source of satisfaction to all scientists interested in the study of the natural history of tropical America in general, and of Central America in particular, to read the entertaining annual reports of the Laboratory for Tropical Research, established on Barro Colorado Island in Gatún Lake in the Panama Canal. Each year shows an increase in the number of investigators who make the laboratory the headquarters for their work. These fortunate students must be envied by the less happy of us, who are forced to spend our winters shut indoors in the cold North.

The increased use being made of this laboratory, so delightfully situated and so comfortably—compared with the quarters usually obtainable in the tropics, one is tempted to say luxuriously—equipped for conducting investigations, is the natural result of the reports brought back by visitors. Sufficient credit will never be given to Dr. Thomas Barbour and Mr. James Zetek for their persistent efforts, in spite of many discouraging obstacles, to make the station a success.

An unusually large number of persons interested in plants visited Barro Colorado in 1929, and several of them made substantial collections of herbarium specimens, which the writer has been privileged to determine. These collections were made by Professor S. W. Frost, of Pennsylvania State College; R. H. Wetmore and R. H. Woodworth, of the Botanical

Museum of Harvard University; and W. N. Bangham and F. M. Salvoza, graduate students of Harvard University. Mr. Bangham's series is one of the finest ever obtained on the island. His specimens are well prepared and complete, and either he visited the locality at an exceptionally favorable season, or else he had a knack of detecting plants overlooked by previous collectors. At any rate, his collection, forwarded to the writer for study from the Arnold Arboretum, contains a surprising number of species new to Barro Colorado, several new to the Canal Zone, and seven which seem to be undescribed.

Mr. Salvoza's collection practically duplicates that made by Mr. Bangham, and the specimens were determined by the collector in comparison with the named set of the latter's plants. Although I have received a list of his numbers, it has not seemed altogether desirable to cite them here, since I have not actually seen the specimens. A few of Mr. Salvoza's specimens which I have examined are listed.

In connection with the descriptions of these new species, it is worth while to list all the additions made in 1929 to the known flora of Barro Colorado Island, which has been recorded by the writer in two published papers.¹ There have been listed heretofore 799 species, chiefly of flowering plants. On the following pages there are reported 63 additional ones, making a very respectable total of 862. It is predicted confidently that this number will be greatly increased by further careful exploration. It is urged particularly upon workers who visit the island that they collect the mosses and other cryptogamic plants.

MOSSES

Determined by EDWIN B. BARTRAM

Philonotis tenella (C. M.) Besch. This and the following, collected by Professor L. A. Kenoyer, were omitted accidentally from the first supplement.

Syrrophodon incompletus Schwaegr.

POLYPODIACEAE

Determined by C. A. WEATHERBY

Acrostichum aureum L. Wetmore & Woodworth, no. 102. A coarse, widely distributed tropical fern, growing usually in shallow water.

Asplenium auritum Sw. Wetmore & Woodworth, no. 132.

Asplenium falcinellum Maxon. Wetmore & Woodworth, no. 129.

Asplenium pteropus Kaulf. Wetmore & Woodworth, no. 133.

Blechnum serrulatum Rich. Wetmore & Woodworth, no. 149.

Dryopteris nicaraguensis (Fourn.) C. Chr. Wetmore & Woodworth, no. 128.

¹ PAUL C. STANDLEY, The flora of Barro Colorado Island, Panama. (Smithson. Misc. Coll., vol. 78, no. 8, pp. 1-32. 1927.)

LESLIE A. KENOYER and PAUL C. STANDLEY, Supplement to the flora of Barro Colorado Island, Panama. (Field Mus. Bot. 4: 143-158, pl. 11-15. 1929.)

MARANTACEAE

Myrosma guapilensis Donn. Smith. Barbour Point to the next point south, *Bangham*, no. 489. A coarse herb 1-2 m. high, with broad canna-like leaves and orange flowers.

MORACEAE

Ficus Oerstediana Miq. Drayton Cabin to the second point north, *Bangham*, no. 509. A small tree with short broad leaves. The fruits are the smallest produced by any Central American species of *Ficus*.

Ficus padifolia HBK. Shores of the lake south of the laboratory, *Bangham*, no. 444. A tree 8 m. high, with small fruits and small narrow leaves. This is the most common wild fig of Mexico and Central America, but, strangely enough, it has not been reported previously from the Canal Zone.

LORANTHACEAE

Oryctanthus spicatus (Jacq.) Eichl. Without data, *Bangham*, no. 421. A parasitic shrub, the small flowers sunken in the rachis of the short spike.

Phthirusa pyrifolia (HBK.) Eichl. Near the lake, *Bangham*, no. 441. A parasitic shrub with oblong obtuse leaves.

POLYGONACEAE

Coccoloba changuinolana Standl. *Bangham*, no. 593. A tree of 12 m., known only from the Atlantic coast of Panama and Costa Rica, and not reported previously from the Canal Zone.

MENISPERMACEAE

Odontocarya truncata, sp. nov.

Frutex scandens, ramulis gracilibus glabris, vetustioribus ochraceis, novellis lenticellis magnis pallidis elongatis conspersis, internodiis elongatis. Folia longe petiolata, alterna, petiolo gracili glabro circa 3.5 cm. longo; lamina subcoriacea, glabra, late ovata vel rotundato-ovata, 9-10.5 cm. longa, 6-7 cm. lata, apice abrupte acuminata, acumine anguste triangulari 1-1.5 cm. longo attenuato obtusiusculo, basi truncata, utrinque glabra, supra viridis, costa nervisque obscuris, subtus paullo pallidior, basi 5-nervia, costa nervisque gracilibus prominentibus, nervulis prominulis laxe reticulatis. Flores feminei racemosi, racemis axillaribus solitariis circa 6 cm. longis, 7 cm. longe pedunculatis, rhachi gracili glabra, pedicellis gracilibus rectis in statu fructifero 9-11 mm. longis. Drupae ovaes luteae, circa 1.5 cm. longae et 1 cm. latae; endocarpium dorso rotundatum convexum, facie ventrali valde concavum.

PANAMA: Barro Colorado Island, Canal Zone, Armour house to second bay north, *W. N. Bangham*, no. 541, September 3, 1929 (Herb, Field Mus. No. 604,409, type; duplicate in herb. Arnold Arb.).

Like most of the other Menispermaceae at present recorded from Central America, this plant is known only from incomplete material, and its true

generic position is therefore not altogether certain. From the described species of *Odontocarya*, two of which are known from the Isthmus of Panama, the plant here named differs in having truncate rather than cordate leaf blades.

MONIMIACEAE

Siparuna guianensis Aubl. Shore of the lake south of the laboratory, *Bangham*, no. 457. A shrub with red fruits and nearly glabrous leaves. Called "hierba de pasmo" in some parts of Panama.

CAPPARIDACEAE

Cleome Houstoni R. Br. Near the end of Pearson Trail, *Bangham*, no. 576. A spiny herb, the leaves with five leaflets.

ROSACEAE

Hirtella triandra Sw. Along the shore, *Bangham*, no. 398. A small tree of 6 m., the flowers white or pink.

CONNARACEAE

Connarus Turczaninowii Triana & Planch. Along the lake shore, *Bangham*, no. 418; *Wetmore & Woodworth*, no. 26. A large woody vine with yellow flowers; leaves with five leaflets.

LEGUMINOSAE

Entada polystachia (L.) DC. Shore of the lake south of the laboratory, *Bangham*, no. 453. A large woody vine with small greenish flowers in dense panicle spikes; pods large and broad, the compressed seeds 2 cm. broad.

Inga cocleensis Pittier. Between Drayton Cabin and Armour Cabin, *Bangham*, no. 528. A tree of 10 m. Not recorded heretofore from the Canal Zone. No less than 14 species of *Inga* are now known to occur on Barro Colorado Island.

Inga confusa Britt. & Rose. Between Drayton Cabin and Armour Cabin, *Bangham*, no. 516. A tree of 12 m. with white flowers.

Inga gracilipes Standl. Between the Drayton and Armour cabins, *Bangham*, no. 522; Barbour Point to the next point south, *Bangham*, no. 488. A tree of 7 m.; flowers in small umbels. The species is known only from the Canal Zone.

Inga laurina (Sw.) Willd. Armour Cabin to the second bay north, *Bangham*, no. 547. A tree 8 m. high; leaflets only two or three pairs; flowers very small; pods small, thin, glabrous.

Inga pauciflora Duchass. & Walp. On the lake shore, *Bangham*, no. 395a.

BURSERACEAE

Protium Salvozae, sp. nov.

Arbor 4-8-metralis, ramulis gracilibus subteretibus brunnescentibus

ubique dense velutino-hirtellis, internodiis elongatis. Folia petiolata, pinnata 5-foliolata, petiolo 2-3 cm. longo gracili subtereti dense hirtello, rhachi 1.8-3 cm. longa, petiolulis 4-8 mm. longis (in foliolo terminali usque ad 2 cm.) dense hirtellis; foliola crasse membranacea, oblonga vel lanceolato-oblonga, 7-12 cm. longa, 2.5-4.5 cm. lata, inferiora paullo minor, subabrupte acuminata, acumine 1 cm. longo et ultra angusto attenuato obtuso, basi acuta et saepe paullo inaequalia, integra, fere concoloria, utrinque ad venas costamque pilis brevibus rigidiusculis patentibus dense hirtella, aliter glabra vel glabrata, costa venisque supra vix prominulis, subtus prominentibus, venis utroque latere c. 12, angulo lato adscendentibus, gracilibus, versus apicem abrupte incurvis, juxta marginem conjunctis, nervulis subtus prominulis laxae reticulatis. Flores sessiles, spicati, spicis axillaribus simplicibus 1-2 cm. longis solitariis, rhachi dense hirtella; fructus ruber, late ovoideus, glabratus, obtusus et apiculatus, 13-15 mm. longus, 10-12 mm. latus, basi obtusus vel subrotundatus.

PANAMA: Barro Colorado Island, Canal Zone, between Drayton and Armour cabins, *W. N. Bangham*, no. 513, September 2, 1929 (Herb. Field Mus., No. 606,248, type; duplicate in herb. Arnold Arb.); near Cabin 2, Barro Colorado Island, *F. M. Salvoza*, no. 948, September 2, 1929 (Herb. Arnold Arb.).

From *P. sessiliflorum* (Rose) Standl. of Panama, which likewise has sessile flowers, the present species differs in its simple flower spikes and pubescent leaflets. *P. asperum* Standl., described from Barro Colorado Island, has very scabrous rather than hirtellous leaflets.

MELIACEAE

Trichilia tuberculata (Triana & Planch.) C. DC. On the lake shore, *Bangham*, no. 434. A tree 7 m. high. Called "alfaje" at Chepo, Panama.

MALPIGHIACEAE

Bunchosia nitida (Jacq.) DC. Between Drayton and Armour cabins, *Bangham*, no. 518. A shrub 2 m. high. The species is new to the Canal Zone.

Spachea elegans Juss. Near Pearson Trail, *Bangham*, no. 579. A tree 8 m. high. The genus is new to Central America, nor has it been found elsewhere on the continent. It occurs in the West Indies.

Stigmaphyllon hypargyreum Triana & Planch. Barbour Point to the next point south, *Bangham*, no. 496. A vine with yellow and red flowers.

VOCHYSIACEAE

Vochysia ferruginea Mart. On the lake shore south of the laboratory, *Bangham*, no. 452. A tree 7 m. high with showy yellow flowers in panicles.

EUPHORBIACEAE

Omphalea diandra L. Drayton Cabin to the second point north,

Bangham, no. 504; *Wetmore & Woodworth*, no. 58. A large woody vine with a fleshy yellow fruit as large as an orange; petioles with two glands at the apex.

ANACARDIACEAE

Mosquitoxylum jamaicense Krug & Urban. Shore of the lake, *Bangham*, no. 426. A tree 7 m. high with softly pubescent, pinnate leaves, the small fruits red. The genus is new to the Canal Zone.

SAPINDACEAE

Paullinia fimbriata Radlk. East shore, *Salvoza*, no. 908; lake shore south of the laboratory, *Bangham*, no. 446. A large woody vine with white flowers; leaflets 5; leaf rachis not winged. The species has not been recorded previously from the Canal Zone.

Serjania mexicana Willd. *Wetmore & Woodworth*, no. 46.

ELAEocarpaceae

Sloanea microcephala Standley in Field Mus. Bot. 4: 152. 1929. The following additional collection may be reported: Between Drayton and Armour cabins, *Bangham*, no. 515. A tree 10 m. high with yellow flowers.

BOMBACACEAE

Hampea panamensis Standl. Between Drayton and Armour cabins, *Bangham*, no. 520. A tree 12 m. high, with small white flowers. The genus has not been collected previously in the Canal Zone.

Quararibea pterocalyx Hemsl. Near Pearson Trail, *Bangham*, no. 581. A tree with large white flowers, the long calyx bearing 10 narrow vertical wings.

DILLENIACEAE

Dolioscarpus brevipedicellatus Garcke. On the lake shore, *Bangham*, no. 400. Fruits red.

Saurauia Zetekiana, sp. nov.

Frutex vel arbor 5-metralis, ramulis crassiusculis glabris lenticellis minutis pallidis elevatis sparse conspersis, internodiis brevibus. Folia sparsa breviter petiolata, petiolo gracili 6-8 mm. longo sparse lepidotofurfuraceo; lamina crasse membranacea, oblongo-elliptica vel late elliptica, 5.5-11.5 cm. longa, 2.8-6 cm. lata, abrupte breviterque acuminata, acumine anguste triangulari attenuato obtusiusculo, basi obtusa vel acutiuscula, fere ad basin grosse crenato-serrata, utrinque glabra, supra viridis, costa venisque non elevatis, subtus paullo pallidior, costa gracili elevata, nervis lateralibus utroque latere 5-8, angulo acuto adscendentibus, subarcuatis, marginem attingentibus, nervulis obscuris. Flores numerosi paniculati, paniculis densifloris 5 cm. longe pedunculatis ca. 5 cm. longis et aequilatis, ramis subdense minuteque ferrugineo-stellato-furfuraceis, pedicellis gracilibus 3-5 mm. longis; sepalis inaequalia late rotundata 1.5-2.5 mm. longa extus sparse stellato-puberula; cetera ignota.

PANAMA: Barro Colorado Island, Canal Zone, near Pearson Trail, *W. N. Bangham*, no. 578, September 8, 1929 (Herb. Field Mus. No. 604, 411, type; duplicate in herb. Arnold Arb.).

The genus is new to the Canal Zone flora, and, indeed, very few *Saurauias* grow at so low an elevation. The present species is easy of recognition because of its small glabrous leaves. It is named for Mr. James Zetek, whose work in establishing the laboratory on Barro Colorado Island has been so eminently successful.

CLUSIACEAE

Clusia odorata Seem. F. L. Island, *Bangham*, nos. 588, 577. A large shrub with pink flowers. This species probably includes all or most of the material reported from Panama as *C. minor* L.

FLACOURTIACEAE

Casearia javitensis HBK. F. L. Island, *Bangham*, no. 587; lake shore south of the laboratory, *Bangham*, no. 443. A shrub or small tree with small white flowers and red fruits. Called "maúro" in Chiriquí, Panama.

PASSIFLORACEAE

Passiflora ambigua Hemsl. Lake shore south of the laboratory, *Bangham*, no. 466.

RHIZOPHORACEAE

Cassipourea podantha Standl. Lake shore, *Bangham*, nos. 566, 416. A tree 8–10 m. high. The species has not been reported from the Canal Zone, but probably it includes a large part of the material previously referred to *C. elliptica* Poir.

COMBRETACEAE

Combretum coccineum (Aubl.) Engl. & Diels. Between Drayton and Armour cabins, *Bangham*, no. 527. A large woody vine with large dense spikes of fiery red flowers, extremely showy and handsome when in blossom.

MYRTACEAE

Myrcia gatumensis Standley in Field Mus. Bot. 4: 154. 1929. The type was collected on Barro Colorado by Professor L. A. Kenoyer. The following new collections may be reported: Barbour Point to the next point south, *Bangham*, no. 498; lake shore south of the laboratory, *Bangham*, no. 451. A shrub about 3 m. high with white flowers.

Eugenia Banghamii, sp. nov.

Frutex 3-metralis, ramulis gracilibus subteretibus ferrugineo-brunneis glabratis, internodiis 1–2.5 cm. longis. Folia breviter petiolata opposita, petiolo crassiusculo 3–4 mm. longo dense breviterque pilosulo; lamina coriaceo-membracea, oblongo-elliptica, 8–10 cm. longa, 3–5 cm. lata, abrupte breviterque acuminata, acumine triangulari obtuso, basi obtusa

vel acutiuscula, supra viridis, epunctata, ubique dense minuteque velutino-pilosula, costa gracillima prominula, venis obscuris, subtus fere concolor, dense velutino-pilosula et pilis patentibus plus minusve intertextis, costa gracili elevata, nervis lateralibus utroque latere circa 9, angulo acuto adscendentibus, fere rectis, remote a margine conjunctis. Flores pauci ad axillas fasciculati, sessiles vel brevissime pedicellati, pedicellis usque ad 1 mm. longis; calyx 3 mm. latus, sepalis 4 rotundatis ciliolatis; baccae immaturae globosae, 3-4 mm. diam., densissime grosseque punctatae, glabrae, calyce persistente coronatae; cetera ignota.

PANAMA: Barro Colorado Island, Canal Zone, on shores of Gatún Lake south of the laboratory, *W. N. Bangham*, no. 448, August 28, 1929 (Herb. Field Mus. No. 604, 410, type; duplicate in herb. Arnold Arb.).

Although only scanty material is available for study, it seems to represent a clearly distinct species of this genus, notable for the abundant soft spreading pubescence of the leaves, and for the sessile or subsessile flowers.

Eugenia melanosticta, sp. nov.

Arbor 4-6-metralis, omnino glabra, ramulis crassiusculis, vetustioribus teretibus pallide cinnamomeis, novellis subcompressis albidis vel ochraceis undique glandulis magnis ovalibus nigris dense notatis, internodiis plerumque 2-3.5 cm. longis. Folia breviter petiolata, opposita, petiolo crassiusculo 5-7 mm. longo supra sulcato; lamina coriacea, oblonga vel anguste elliptico-oblonga, 8-12 cm. longa, 3.5-4.5 cm. lata, breviter acuteque acuminata, basi acuta vel acutiuscula et brevissime decurrens, fere concolor, supra minutissime impresso-puncticulata, costa profunde impressa, venis obsoletis, subtus dense elevato-puncticulata, costa gracili elevata, venis obscuris. Inflorescentiae axillares solitariae, subracemosae, laxae pauciflorae, 1-2.5 cm. longe pedunculatae, pedicellis crassis 4-7 mm. longis; fructus basi bibracteolatus, bracteolis c. 1 mm. longis rotundatis; bacca globoso-ovalis, 10-12 mm. longa, 8-9 mm. lata, basi et apice rotundata, calyce persistente coronata, densissime tuberculato-glandulosa; calyx 4.5 mm. latus, 5-lobus, lobis late rotundatis brevissimis.

PANAMA: Barro Colorado Island, Canal Zone, Shores of Gatún Lake south of the laboratory, *W. N. Bangham*, no. 445, August 28, 1929 (Herb. Field Mus. No. 606, 247, type; duplicate in herb. Arnold Arb.); east shore of Barro Colorado Island, *F. M. Salvoza*, no. 909, August 28, 1929.

The material of this tree available for study is rather unsatisfactory, but it seems better referable to *Eugenia* than to any other group known from Central America, and it is perhaps worth while to give it a name in order to bring it to the attention of future students. The species is noteworthy for the very numerous and conspicuous black glands of the young branchlets.

MELASTOMACEAE

Miconia minutiflora (H. & B.) DC. Barbour Point to the next point south, *Bangham*, no. 486. A shrub or small tree about 5 m. high, with small white flowers.

SAPOTACEAE

Lucuma glabrifolia Pittier? North shore near the end of Pearson Trail, *Salvoza*, no. 999. A tree 10 m. high with milky sap and a large, yellowish green fruit. The determination is very uncertain, because of the absence of flowers, and the tree may well represent an undescribed species.

APOCYNACEAE

Echites microcalyx A. DC. Barbour Point to the next point south, *Bangham*, no. 494. A slender vine; corolla yellow with red throat.

Echites trifida Jacq. On shore at the end of the island, *Bangham*, no. 573. A vine with greenish yellow flowers.

Prestonia macrocarpa Hemsl. Shore of the lake south of the laboratory, *Bangham*, no. 467; shore at the end of the island, *Bangham*, no. 569. A large woody vine.

CONVOLVULACEAE

Aniseia martinicensis (Jacq.) Choisy. F. L. Island, *Bangham*, no. 589. An herbaceous vine with narrow oblong obtuse leaves; corolla white.

VERBENACEAE

Aegiphila cephalophora Standley in Field Mus. Bot. 4: 156. 1929. Type collected on Barro Colorado by Professor Leslie A. Kenoyer. Another collection may now be reported: Armour Cabin to the second bay north, *Bangham*, no. 543x.

SOLANACEAE

Solanum Hayesii Fernald. Between Drayton and Armour cabins, *Bangham*, no. 514; Drayton Cabin to the second point north, *Bangham*, no. 501. A prickly tree about 7 m. high with white flowers. The species is known only from the Canal Zone.

Markea panamensis, sp. nov.

Frutex scandens, ramulis crassiusculis ochraceis vel brunnescentibus subteretibus, internodiis plerumque elongatis, floriferis vulgo dense foliatis vel cicatricibus foliorum delapsorum dense notatis. Folia breviter petiolata, alterna vel subopposita, petiolo crassiusculo 7–13 mm. longo glabro supra sulcato; lamina pergamentacea, oblanceolato-oblonga vel obovato-oblonga, 8–14 cm. longa, 3–4 cm. lata, acuta et abrupte cuspidato-acuminata, acumine angusto attenuato, versus basin acutam vel acuminatam sensim angustata, utrinque glabra, integra, costa nervisque supra vix elevatis inconspicuis, subtus paullo pallidior, costa gracili elevata, nervis lateralibus utroque latere circa 7, angulo acuto latove adscendentibus, gracillimis, prominulis, margine saepe subrevoluto. Flores ad apices ramulorum fasciculati vel breviter racemosi, pedicellis gracilibus 5–10 mm. longis furfuraceo-puberulis vel glabratiss; calyx viridis fere ad basin 5-fidus, laciniis oblongis 5–9 mm. longis acutiusculis vel obtusis sparse minuteque puberulis 3-nerviis; corolla lutea infundibuliformis, 1.5 cm. longa, extus minutissime

puberula, 5-nervia, tubo 4 mm. longo 1.2 mm. crasso, fauce 7 mm. longa, ore 6 mm. lata, lobis 5 ovali-ovatis fauce paullo brevioribus obtusis. Bacca immatura ovoidea, 13 mm. longa.

PANAMA: Barro Colorado Island, Canal Zone, Armour House to the second bay north, *W. N. Bangham*, no. 543, September 3, 1929 (Herb. Field Mus. No. 604,412, type; duplicate in herb. Arnold Arb.). Along the Sambú River, southern Darién, at sea level, *H. Pittier*, no. 5566, February, 1912.

The plant is noteworthy in the genus for its very small flowers. It could be referred equally well, probably, to the genus *Merinthopodium* Donn. Smith, whose distinctness from *Markea* is open to question.

BIGNONIACEAE

Anemopaegma punctulatum Pitt. & Standl. Across the bay from Drayton Cabin, *Bangham*, no. 544; also *Wetmore & Woodworth*, no. 40. A large woody vine with showy yellow flowers.

Arrabidaea panamensis Sprague. Shore of the lake south of the laboratory, *Bangham*, no. 449. A woody vine with small, pale lavender flowers.

Petastoma breviflorum, sp. nov.

Frutex scandens, ramis gracilibus teretibus ochraceis striatis lenticellis paucis parvis elevatis conspersis, novellis sparse pilosulis cito glabratiss, internodiis elongatis. Folia bifoliolata, opposita, 8–14 mm. longe petiolata, petiolo gracili dense breviterque piloso, petiolulis 8–15 mm. longis gracilibus pilosis; foliola late elliptica, 6.5–9.5 cm. longa, 3–6.5 cm. lata, abrupte acuta vel acuminata, acumine triangulari vel anguste triangulari attenuato acuto vel obtuso, basi obtusa vel rotundata, crasse membranacea, fere concoloria, luteo-viridia, supra glabra, sparse et minutissime pallido-puncticulata, nervis prominulis, subtus ubique sed praesertim ad venas pilis mollibus albidis sparse pilosa, costa nervisque elevatis, nervulis prominulis et reticulatis. Paniculæ terminales subdense multiflorae foliis vix longiores, ramulis gracilibus dense breviterque pilosis, floribus graciliter pedicellatis; calyx extus sparse puberulus vel fere glaber, 5 mm. longus et aequilatus, parte inferiore turbinata, limbo patelliformi remote obscureque denticulata; corolla purpurea, tubo 5–6 mm. longo gracili tereti 2 mm. crasso extus glabro, fauce campanulata 6 mm. longa ore circa 8 mm. lata extus glabra, lobis subaequalibus ovalibus 6 mm. longis apice rotundatis extus et intus densissime puberulo-tomentosis; stylus gracilis glaber. Capsula immatura linearis compressa, 26 cm. longa et ultra, 8 mm. lata, glabra, basin versus paullo angustata.

PANAMA: Barro Colorado Island, Shores of Gatún Lake, south of the Laboratory, *W. N. Bangham*, no. 465 in part, August 28, 1929 (Herb. Field Mus. no. 604,413, type); lake shore near the laboratory, *W. N. Bangham*, no. 553, September 3, 1929 (Herb. Arnold Arb.).

Bangham no. 465, as represented in the herbarium of Field Museum, consists of a mixture of two quite distinct plants. The flowering specimens are *Arrabidaea panamensis* Sprague, while the specimens with young fruit belong to the species here described.

Petastoma breviflorum is evidently an ally of *P. patelliferum*, having the same peculiarly distributed pubescence on the corolla, but the flowers of *P. breviflorum* are very much smaller than those of the latter species.

RUBIACEAE

Amaioua corymbosa HBK. Shore of the lake south of the laboratory, *Bangham*, no. 456. A shrub with fleshy red fruits.

Genipa americana L. Near Drayton Cabin, *Bangham*, no. 503. In this species the leaves are glabrous, while in *G. caruto* HBK., which also grows on Barro Colorado, they are densely pubescent beneath. I am now inclined to believe that these two forms represent distinct species.

Hamelia axillaris Sw. Between Wheeler and Shannon trails, *Bangham*, no. 472.

CUCURBITACEAE

Gurania coccinea Cogn. Collected by S. W. Frost, no. 229. An herbaceous vine with showy red flowers, Called "bien-te-veo" in some parts of Panama.

COMPOSITAE

Elephantopus mollis HBK. Collected by S. W. Frost, no. 286. A low herb with clustered heads of white or purple flowers; leaves mostly basal.

Mikania guaco H. & B. F. L. Island, *Bangham*, no. 597. An herbaceous vine with small heads of white flowers.

FIELD MUSEUM OF NATURAL HISTORY
CHICAGO

RHADINOPUS, A PRESUMED NEW GENUS OF RUBIACEAE FROM NEW GUINEA

S. MOORE

With a figure

Rhadinopus,¹ gen. nov.

Calycis tubus obconicus; limbus cupularis, 5-denticulatus. Corollae calycem facile superantis tubus ima basi contractus, inde late cylindricus, faucibus glabris; limbus 5-lobus, lobis tubo plane brevioribus, patentibus, aestivatione contortis. Stamina 5, paullo infra medium tubum corollae inserta; antherae dorsifixae, sessiles, inclusae. Discus annularis. Ovarium 1-loculare; stylus crassus, complanatus, sursum biramosus, brevissime exsertus; ovula plura, placentis 2 parietalibus affixa. Bacca globosa, carnosa, verisimiliter oligosperma.—Frutex glaber, fere humanae altitudinis. Folia ampla, opposita, pergamacea. Stipulae basi connatae, diutule persistentes. Flores inter minores, fortasse nonnunquam solitarii, verisimiliter plerumque in cymas perpaucifloras pedunculum elongatum patentem bracteis parvulis raris indutum coronantes digesti.

Rhadinopus papuanus, sp. unica.

Ramulis tetragonis, subdistanter foliosis; foliis oblongo-ovatis, breviter acuminatis, basi obtusis, pagina superiore nitidulis pagina utraque sparsim pustulatis, nervis utrinque circa 8, mediocriter visibilibus, 10–12 × 4–5.5 cm.; petiolis canaliculatis, fere 1 cm. longis; stipulis triangularibus, acutis

¹ ῥαδινός, slender, and πούς, foot or foot-stalk.



RHADINOPUS PAPUANA S. Moore

1. Flowering branch (nat. size).—2. Flower ($\times 2$).—3. Corolla laid open ($\times \frac{1}{2}$).—4. Anther ($\times 3$).—5. Stigma ($\times 2$).

vel caudato-acuminatis, circa 5 mm. longis; pedunculis paullulum supra-axillaribus gracilibus 7–8 cm. longis; calycis tubo tetragono 3.5 mm. longo, limbo 1.5 mm. longo; corollae albae tubo intus sparsim papilloso 13×6

mm., lobis late ovatis 5 mm. longis; antheris linearibus, apice lamina lineari-lanceolata acuta terminatis, 8 mm. longis; stylo apice leviter dilatato, glabro, 14 mm. longo, hujus ramis erectis, 2 mm. longis; bacca viva viridi, 12 mm. diametiente.

BRITISH NEW GUINEA: Owen Stanley Range between Mts. Brown and Clarence, alt. 900 m., *L. J. Brass*, no. 1495, May 1926 (bush 5 ft. high; flowers white, on long axillary peduncles; fruit globose, fleshy, pale green). Type in the herbarium of the Arnold Arboretum.

The genus is near *Gardenia* and several of the genera associated with it. From *Gardenia* it differs chiefly in its small flowers, stamens inserted below the middle of the corolla-tube not in its throat, and the 2-armed stigma; from *Nargedia* in the glabrous corolla-mouth, included stamens, 1-celled ovary and in the inflorescence. The glabrous corolla-mouth and the bilobed, not entire and densely hairy stigma separates it from *Villarea*. Among other genera *Hypobathrum* with its short, axillary inflorescences, its densely hairy corolla-throat, 2-celled ovary and hispid style-arms may be mentioned, as also *Petunga* in which we have spicate inflorescences, and a 2-celled ovary with ovules pendulous from the top of the cells.

There being only a single flower on the specimen, great care has been necessary in order to leave the remains after dissection as little damaged as possible. This has made a longitudinal section of the ovary inadvisable, so that some doubt remains as to the precise number and disposition of the ovules. As regards the inflorescence, there are indications of branching at the top of the long and slender peduncles, and this would seem to indicate a few-flowered cyme to be the rule as is indicated in the description.

BRITISH MUSEUM (NATURAL HISTORY)
LONDON

NOTES

Additions to the Library.—Mr. FREDERIC A. DELANO has presented to the Library the most unique gift of recent years, to serve as a memorial to his father Warren Delano, 1809–1898, with the purpose of making it “of real value to students.”

It consists of six hundred and eleven paintings of Chinese fruits, flowers and vegetables, natural size, beautifully executed by native artists on sheets 15" × 19". Some of them are of well-known plants that have been introduced into this country such as the Rose, Peony, Chrysanthemum, Camellia, etc., but many of them are very rare. In his presentation letter Mr. Delano writes, “My Father, Warren Delano, was one of the early Boston merchants engaged in the China trade—and went there in 1835. He lived in China for more than 20 years, between 1835 and 1866, chiefly in Canton, Macao and Hong Kong connected with the House of Russell & Co. During his stay he endeavored to learn about the products of the country and in the 40's he collected and had drawn by Chinese artists over 500 paintings of 200 or more fruits, flowers and vegetables.”

These paintings are replete with interest, botanical, artistic, and historical. They were apparently done by various artists with varying degrees of skill over a period of years. The paper on which they were painted is evidently of English manufacture, the earliest water-marks being "I. Taylor 1794" and "E. & P. 1794", and the latest "Ruse & Turners 1832." Between these are various other dates, many of which bear the name of J. Whatman, and in 1828, "J. Whatman, Turkey Mill" with design resembling a coat-of-arms.

The paintings are exquisitely drawn, in beautiful colors marvelously preserved, with details of fruit and flower, some bearing both on the same plant. Occasionally two plants are figured on the same sheet.

There are 34 paintings of Orchids and a large collection of Camellias.

The names are given in Chinese, with English transliteration and translations which have a quaintness and a flavor of their own, such as:—*Hemerocallis flava* (tah e kwan kin—undressed changed to silk), *Michelia fuscata* (nan seaou hwa—repressed smile flower), *Hovenia dulcis* (wan tsze kwo—fruit like the letter wan), *Dolichos* (kwo shan chun—passing hill stopping), *Thunbergia grandiflora* (shan kien new—hill leading cow), *Nicotiana tabacum* (yen pwa—smoke flower!), *Impatiens chinensis* (kwo tang shay—passing pool snake), *Plumbago rosea* (yen lae hung—wild-goose comes red), *Asclepias curassavica* (ma le kin—horse's tongue string), *Clematis chinensis* (wei ling sien—dreading spirit genii), *Lycoris sanguinea* (kang e tsaou—changing dress herb), *Abrus precatorius* (hung siang sze—red causing thought), *Murraya exotica* (kew le heang—nine mile fragrance), *Rosa Banksiae lutescens* (muh heang hwa—wooden fragrance flower), *Plumbago zeylanica* (che tau po—viscous head old woman) and *Sapindus mukorossi* (woo hwan tsze—without sorrow seeds). In most cases botanical names were also given and to these have been added further identifications.

The paintings were presented in two large mahogany boxes fashioned in the likeness of books, in which the elder Mr. Delano had preserved them.

Mr. Delano's gift is of especial value as it adds a new importance to our already unusual collection of material on Chinese botany and travels, a collection unsurpassed in this country.

Mrs. SUSAN DELANO MCKELVEY has again placed the Library in her debt by the gift of a most unusual collection of beautiful photographs taken by her in Arizona from January to June 1929.

They represent a variety of woody subjects including a large number of photographs of Agaves and of the Cactaceae family of which Mrs. McKelvey has made an intensive study.

The photographs, marvelously clear, showing patience and skill, are enlightening as to the wonderful beauty of the desert plants at their best, and are a priceless addition to the Library's collection.

Miss VIOLET F. EDLMANN has presented a large number of valuable tree photographs taken in Arizona, January to February, 1929.

Mrs. L. A. FROTHINGHAM has presented to the Library the fifth and

concluding volume of MARY A. WALCOTT's beautiful colored plates "North American Wild Flowers."

Mr. E. H. WILSON has presented his latest volume of garden classics "Aristocrats of the Trees"¹ published by the Stratford Company, attractively bound and beautifully illustrated with photographs of trees in every land. The book is a fine combining of accurate scientific knowledge and historical and aesthetic treatment in most readable form.

A general introduction to trees, the physiology of root and bark, esthetic beauty, and economic and vital importance to the life of man, with a word on the history and significance of Arbor Day, is followed by chapters on individual trees and groups of trees.

A short chapter is devoted to "Pleached Alleys," rare in this country, and about which little has been written.

Mr. Wilson's intimate knowledge of trees is gained through extensive travel, and for his photographs he has drawn largely upon the Library's collection without which he states the work would have been impossible in its present form.

He has also presented for the photograph collection a copy of the frontispiece of "Aristocrats of the Trees," a remarkably fine reproduction in color of a beautiful painting, "Maple Woods in Autumn, Lake Chuzenji, Japan" by the Japanese artist S. Ishida.

After years of patient effort the Library has acquired by purchase JOSIAH CONDER's "Landscape Gardening in Japan" with its quaint, idealistic Japanese drawings, and text giving an "exposition of the rules and theories of the art of landscape gardening in Japan, as followed from ancient to modern times, so far as they can be gathered from a thorough study of native authorities, added to personal observation of the best remaining examples"; also his "Supplement to Landscape Gardening in Japan," illustrated with photographs of existing gardens, which the author states, "are but imperfect and fragmentary examples of a craft comparatively neglected in recent days."—E. M. T.

Notes from the Herbarium.—During the last months the ligneous plants collected by W. P. Fang in Szechuan for this institution and the Science Society of China amounting to about 1500 numbers have been identified; the collection contained many species not yet recorded from Szechuan and a number of new species and varieties which will be described in this Journal. The herbaceous plants, more than 2000 numbers, are being determined at Edinburgh.

The plants collected by S. F. Kajewski during 1928-1929 in the New Hebrides for this institution and the California Botanic Garden have now been all received and most of them have been sent on to Dr. A. Guillaumin of Paris, who has kindly consented to determine this collection with the exception of some groups which have been sent to specialists.

¹ WILSON, ERNEST H. *Aristocrats of the trees*. With frontispiece and sixty-six plates. f. (2) + xxi + 279 pp. The Stratford Company, Boston [Cop. 1930].

The whole collection comprises about 900 numbers with many duplicates. Mr. S. F. Kajewski has by this time left Australia for the Solomon Islands where he will collect during the year for this institution and the Bishop Museum in Honolulu.

Mr. F. M. Salvoza of the School of Forestry, University of the Philippines, Los Banos, Laguna, Philippine Islands has nearly finished his monograph of *Rhizophora* forming his thesis for the Ph.D. degree on which he has been working in the herbarium since last year.

Mr. Chien Pei of Chengtu, Szechuan province, China has spent two weeks in the herbarium in connection with a revision of the Chinese Verbenaceae which he is preparing as his theses for the Ph.D. degree.



THUJA ORIENTALIS L.
Tree in Chungsan Park, Peking